

Public Information Materials

11/28/01

Restoration Advisory Board Meeting Held at Irvine City Hall Irvine, CA

Materials/Handouts Include:

- RAB Meeting Agenda/Public Notice – 11/28/01 RAB meeting.
- Meeting Minutes from the September 19, 2001 RAB Meeting – 53rd RAB.
- MCAS El Toro RAB Subcommittee Meeting Minutes, May 30, 2001 meeting.
- MCAS El Toro RAB Meeting Schedule, Full RAB and RAB Subcommittee (Sept. 2001 – July 2002).
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- MCAS El Toro Restoration Advisory Board – Membership Roster, Revival November 2001.
- RAB Membership Application – MCAS El Toro RAB.
- MCAS El Toro Installation Restoration Program – Mailing List Coupon.
- MCAS El Toro Administrative Record File - Information Sheet (for on-Station access).
- MCAS El Toro Information Repository - Information Sheet.
- MCAS El Toro Where To Get More Information Sheet.
- Internet Access – Environmental Web Sites.
- MCAS El Toro Marine Corps/Navy RAB Co-Chair (address, telephone, fax, e-mail).
- MCAS El Toro - For More Information on Redevelopment.
- Contact information for Steven Sharp, RAB member representing Orange County Health Care Agency.
- Glossary of Technical Terms.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- MCAS El Toro Base Realignment and Closure Business Plan, Introduction Section, March 2001.
- MCAS El Toro Environmental Compliance Program Location of Concern (LOC) Status Table (November 7, 2001).
- Excerpt from Meeting Minutes from the January 31, 2001 RAB Meeting, 49th RAB – Update on Norwalk Pipeline.
- MCAS El Toro – Proposed Plan – Groundwater Cleanup for Operable Units 1 and 2A – November 2001.
- MCAS El Toro – Public Comment Form – Proposed Plan – Groundwater Cleanup, Operable Units 1 and 2A.
- *Presentation* – MCAS El Toro IRP Site 2 and 17 Remedial Design Update, November 28, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.
- *Presentation* – IRP Site 1 Remedial Investigation Ordnance/Explosives Range Evaluation, MCAS El Toro, November 28, 2001, Presented by Buzz Barton and Eli Vedagiri, Earth Tech, Inc.
- *Presentation* – Status of Radiological Surveys, MCAS El Toro Restoration Advisory Board Meeting, November 28, 2001, Presented by Bruce Christensen, Roy F. Weston, Inc.
- *Presentation* – Preliminary Assessment Building 307 - MCAS El Toro Restoration Advisory Board Meeting, November 28, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- U.S. EPA Comments on the Draft Final Phase II Focused Feasibility Study and Draft Proposed Plan, OU-3, IRP Site 16, Crash Crew Training Pit No. 2, Marine Corp Air Station, El Toro - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated September 14, 2001).
- U.S. EPA Comments on Draft Technical Memorandum, Reevaluation of Risk for IRP Sites 8, 11, and 12, Marine Corps Air Station, El Toro, dated August 2001 – To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated September 27, 2001).

- U.S. EPA Comments on Draft Work Plan, Aquifer Test, IRP Site 2, Marine Corps Air Station, El Toro, dated August 2001 – To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated October 2, 2001).
- U.S. EPA Response to FFA Schedule Extension Request for Sites 3 and 5, Marine Corps Air Station, El Toro, dated November 14, 2001 – To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated November 15, 2001).

Agency Comments and Letters – California Environmental Protection Agency (Cal-EPA)

- Cal-EPA, Department of Toxic Substances Control (DTSC) – Comments on Draft Work Plan, Aquifer Test, Installation Restoration Program Site 2, Magazine Road Landfill, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated October 3, 2001).
- Cal-EPA, DTSC – Response to Federal Facility Agreement Schedule for Operable Unit 2C, Installation Restoration Program IRP Sites 3 and 5, MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: John E. Scandura, DTSC (letter dated November 26, 2001).

California Regional Water Quality Control Board (RWQCB), Santa Ana Region

- RWQCB - Comments on Draft technical Memorandum Evaluation of OU-1, Alternative 8A with Respect to National Oil and Hazardous Substances Pollution Contingency Plan Criteria, Former MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, SLIC/DoD/AGT Section, Santa Ana Regional Water Quality Control Board, (letter dated October 4, 2001).
- RWQCB - Comments on Closure Report, Location of Concern, MSC JP-5, JP-5 Pipeline Units MSC JP5-1 and MSC JP5-3, Former MCAS El Toro; – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 11, 2001).
- RWQCB - Comments on Addendum to Site Assessment Report, Firefighter Burn Pit MSC B1, Former MCAS El Toro; – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 11, 2001).
- RWQCB - Comments on Addendum to Summary Report, Aerial Photograph Anomaly (APHO) Area 5, APHO 31, APHO 43, APHO 66, and APHO 68, Former MCAS El Toro – To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 17, 2001).
- RWQCB - Comments on Draft Technical Memorandum, Phase II Evaluation of Radionuclides in Groundwater at Former Landfill Sites and the Explosive Ordnance Disposal (EOD) Range, Former U.S. MCAS, El Toro – To: Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 20, 2001).
- RWQCB - Comments on Draft Work Plan, Aquifer Test, IRP Site 2, Magazine Road Landfill, Former U.S. MCAS El Toro – To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 17, 2001).
- RWQCB - Comments on Draft Technical Memorandum – Replacement Well Installation and Groundwater Evaluation, Former U.S. MCAS, El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 17, 2001).
- RWQCB - Comments on Draft Technical Memorandum, Preliminary Assessment, Building 307, Former MCAS, El Toro – To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated October 29, 2001).

RAB Subcommittee Handouts and Letters *(provided by Marcia Rudolph, MCAS El Toro RAB Subcommittee Chair)*

- MCAS El Toro Subcommittee Meeting Minutes – 5/30/01 meeting (included with September 19, 2001 RAB meeting mailer; attachment to RAB Meeting Agenda/Public Notice and Meeting Minutes 11/28/01 RAB meeting).
- Emails dated August 23, 2001: From – Lenny Siegel, Center for Public Environmental Oversight, To: Military Environmental Forum; Subject: Department of Defense, Environmental Budget Figures.
- Letter dated October 19, 2001 – To Gerald J. Thibeault Executive Officer, California Regional Water Quality Control Board Santa Ana Region. From: Robert L. Woodings, P.E. Director of Public Works/City Engineer, City of Lake Forest; Subject: Comments on September 12, 2001, Draft Tentative Order No. 01-20 (NPDES No. CAS618030), Orange County Areawide Stormwater NPDES Permit.

- Letter dated November 7, 2001 - To Nicole Moutoux, U.S.EPA, Triss Chesney, CAL-EPA DTSC; Patricia Hannon, Santa Ana RWQCB, Dean Gould, Southwest Division, BRAC Operations Office; From Daniel Jung, Director of Strategic Programs, City Managers Office, City of Irvine; Subject: Additional Comments on the Draft Technical Memorandum, Preliminary Assessment, Building 307, MCAS El Toro (October 22, 2001).
- Letter dated November 26, 2001 - To Nicole Moutoux, U.S.EPA, Triss Chesney, CAL-EPA DTSC; Patricia Hannon, Santa Ana RWQCB, Dean Gould, Southwest Division, BRAC Operations Office; From Daniel Jung, Director of Strategic Programs, City Managers Office, City of Irvine; Subject: Additional Comments on the Draft Technical Memorandum, Preliminary Assessment, Building 307, MCAS El Toro (October 22, 2001).



BECHTEL NATIONAL INC.

CLEAN II TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N-68711-92-D-4670

Document Control No.: CTO-0200/0340

File Code: 0216

TO: Contracting Officer
Naval Facilities Engineering Command
Southwest Division
Mr. Richard Selby, Code 02R1
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: January 15, 2002

CTO #: 200 (EL2)

LOCATION: MCAS El Toro

FROM:

Thurman L. Heironimus, Project Manager

DESCRIPTION: MCAS El Toro, Public Information Materials 11/28/01 Restoration Advisory Board
Meeting Held at Irvine City Hall, Irvine, CA

TYPE: Contract Deliverable X CTO Deliverable Other
(Cost) (Technical)

VERSION: N/A REVISION #: 0

ADMIN RECORD: Yes X No Category Confidential
(PM to Identify)

SCHEDULED DELIVERY DATE: 1/15/02 ACTUAL DELIVERY DATE: 1/15/02

NUMBER OF COPIES SUBMITTED: O/5C/4E

COPIES TO (Include Name, Navy Mail Code, and No. of Copies):

SWDIV:

G. Tinker, 06CC.GT (O)
Basic Contract File, 02R1 (1C)
D. Gould, 06CM.DG (1C/1E)
D. Silva, 05G.DS (3C/3E - 2 for AR
1 for IR)

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**MCAS El Toro
Restoration Advisory Board**

**Irvine City Hall
Conference and Training Center
One Civic Center Plaza, Irvine**

**November 28, 2001
6:30-9:00 p.m.
54th Meeting**

**RAB Subcommittee Meeting
5:00-6:00 p.m., Room L-104**

AGENDA

RAB members that are unable to attend please call either Dean Gould, Marine Corps/Navy RAB Co-Chair at (949) 726-5398 or (619) 532-0765 -or- Greg Hurley, RAB Community Co-Chair at (949) 719-2289.

Question and Answer (Q&A) Ground Rules

- **Q&A follows individual presentations; time designated for presentations includes Q&A time.**
- **"Open Q&A" session (environmental topics) is at the end of the New Business segment.**
- **After adjournment, Marine Corps/Navy representatives are available to answer more questions.**

Welcome/Introductions/Agenda Review (6:30-6:40)

Dean Gould
Marine Corps/Navy RAB Co-Chair

Old Business (6:40-7:05)

Approval of 9/19/01 Minutes (6:40-6:45)

Greg Hurley
RAB Community Co-Chair

Announcements/Review of Action Items (6:45-6:55)

Dean Gould & Greg Hurley

Subcommittee Meeting Report (6:55-7:05)

Marcia Rudolph
RAB Subcommittee Chair

New Business (7:05-8:55)

- Chuck Bennett Memorial Award for Outstanding Service to the MCAS El Toro RAB (7:05-7:10)

Dean Gould

- Regulatory Agency Comment Update (7:10-7:25)

Nicole Moutoux U.S. EPA	Triss Chesney Cal-EPA DTSC	Patricia Hannon RWQCB
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- Sites 2 & 17 Landfill Cap Design/Alton Parkway Extension (7:25-7:45)

Crispin Wanyoike
Earth Tech, Inc

- Site 1, Explosives Ordnance Range – Remedial Investigation Overview/Draft Final Ordnance Explosives Work Plan (7:45-8:05)

Greg Peterson
Earth Tech, Inc

BREAK -- 10 minutes

- Radiological Survey Fieldwork Update (8:15-8:35)

Bruce Christensen
Roy F. Weston, Inc.

- Update on Building 307 Soil Gas Sampling (8:35-8:50)

Crispin Wanyoike

- Open Q&A (Environmental Topics) (8:50-8:55)

Dean Gould

Meeting Summary & Closing (8:55-9:00)

Meeting Evaluation & Suggested Topics for Future Meetings

Greg Hurley & Dean Gould

P U B L I C N O T I C E

MARINE CORPS AIR STATION EL TORO

Restoration Advisory Board Meeting



54th Meeting

Wednesday, November 28, 2001

6:30 - 9:00 p.m.

Irvine City Hall

Conference and Training Center

One Civic Center Plaza, Irvine

The Restoration Advisory Board (RAB) is composed of concerned citizens and government representatives involved in the environmental cleanup program at MCAS El Toro since 1994. Community participation and input is important and appreciated. This meeting will feature the following activities and presentations specific to MCAS El Toro:

- Sites 2 and 17 Landfill Cap Design/Alton Parkway Extension Update
- Site 1, Explosives Ordnance Range – Remedial Investigation
Overview/Draft Final Ordnance Explosives Work Plan
- Radiological Survey Fieldwork Update
- Update on Building 307 Soil Gas Sampling



For more information about this meeting and the Installation Restoration Program at MCAS El Toro, please contact:

Base Realignment and Closure

Mr. Dean Gould

BRAC Environmental Coordinator

P.O. Box 51718, Irvine, CA 92619-1718

(949) 726-5398 or (619) 532-0784

MARINE CORPS AIR STATION EL TORO
RESTORATION ADVISORY BOARD MEETING

September 19, 2001 – 53rd Meeting

MEETING MINUTES

The 53rd Restoration Advisory Board (RAB) meeting for Marine Corps Air Station (MCAS) El Toro was held Wednesday, September 19, 2001 at the Irvine City Hall. The meeting began at 6:35 p.m. These minutes summarize the discussions and presentations from the RAB meeting.

WELCOME, INTRODUCTIONS, AGENDA REVIEW

Mr. Dean Gould, BRAC Environmental Coordinator (BEC) for MCAS El Toro and Marine Corps RAB Co-Chair, called the 53rd RAB meeting to order. He asked that everyone participate in a moment of silence to reflect on the tragic events of September 11, 2001. Next, all present participated in the Pledge of Allegiance. He asked all those in attendance to introduce themselves and self-introductions were made. Mr. Gould presented an overview of the agenda.

OLD BUSINESS

Review and Approval of the July 25, 2001 Meeting Minutes

Mr. Greg Hurley, RAB Community Co-Chair stated that he has one comment (not a revision) pertaining to page 5 in regard to the discussion of naturally occurring radionuclides in groundwater presented in the Technical Memorandum for the Phase II Radionuclide Evaluation. The U.S. EPA asked the Navy to document the range of concentrations for future groundwater investigations. He said that this issue was discussed in the RAB Subcommittee meeting earlier this evening, and the RAB supports the U.S. EPA's request.

Mr. Richard Bell, RAB member representing the Irvine Ranch Water District (IRWD), stated that on page 9, where the agencies are listed, the Municipal Water District of Orange County needs to be included in that list. He asked that this agency be added to the list.

RAB members approved and accepted the meeting minutes with the above-mentioned amendments.

Announcements

- Mr. Gould announced that Mr. Bruce Christensen, Roy F. Weston, Inc., and Ms. Nicole Moutoux, U.S. EPA, will be absent this evening due to the airline problems related to the September 11, 2001 attack. Mr. Fred Meier, RAB member, also left word that he would not be able to attend this evening.
- Mr. Gould stated that he had received a memo via fax from Mr. Novel James, RAB member, announcing his resignation from the RAB due to personal and health issues.
- Mr. Gould confirmed that the next full RAB meeting (6:30-9:00 p.m.) and RAB Subcommittee meeting (5:00-6:00 p.m.) would be held on Wednesday, November 28, 2001.

- Mr. Gould provided information regarding the MCAS El Toro Information Repository (IR) which is located at the Heritage Park Regional Library in Irvine and the Administrative Record (AR) file located on-Station at Building 368. He urged attendees to take advantage of these resources. Both the AR and IR contain information and documentation related to the environmental investigation and cleanup at MCAS El Toro. (See page 17 for more IR location information).
- Mr. Gould announced that the phone number for reaching the BEC at MCAS El Toro has recently been changed. The new number to reach him is (949) 726-5398, and it is also being shared with Ms. Marge Flesch (*replacement for Charly Wiemert*). He added that the old number [949-726-2840] has been disconnected.
- Mr. Gould stated that the soil gas sampling activities centered at Building 307 began this week. The sampling is being done in response to the City of Irvine's Solvent Study that questioned if there was more contamination present than previously reported by the Navy. He invited anyone interested in observing these activities to contact let him know this evening or in the next couple of days so a tour can be arranged.. Sampling will be taking place on Monday and Tuesday of next week both inside and outside Building 307.
- Mr. Gould stated that this week the Commanding Officer at SWDIV will be signing a [Finding of Suitability to Transfer] FOST-like document. This is the first step in the process that supports the federal agency-to-federal agency transfer of Site 1, the Explosives Ordnance and Disposal (EOD) Range, from the Navy to the FBI. He explained that the FOST-like document is an environmental document that states what the current conditions of the site are and clarifies its suitability for transfer under the current site environmental conditions.

Discussion

Ms. Kim Foreman, Public Participation Specialist, DTSC, observed that there are only three community members attending tonight's RAB meeting. The rest of the attendees are either Marine Corps/Navy personnel or with the regulatory agencies.

Greg Hurley asked that the Radiological Survey presentation be postponed until Mr. Christensen could be present to answer questions. Mr. Gould replied that he has some valuable information to provide this evening, and that Mr. Christensen will be present at the next RAB meeting.

RAB Subcommittee Meeting Report, Ms. Marcia Rudolph, RAB Subcommittee Chair

Ms. Rudolph stated that the minutes from the RAB Subcommittee meeting of May 30, 2001, along with the list of attendees, were approved and submitted for distribution to the RAB. The Subcommittee had reviewed the status of various documents that were issued for review. A key concern of the RAB Subcommittee is the relationships between Sites 2 and 5 and the soil and groundwater analysis. She said that the next Subcommittee meeting will be on November 28, 2001, just prior to the full RAB meeting.

Ms. Rudolph stated that she had made a request for a representative from GeoSyntec, a consultant to the Local Reuse Authority for Orange County, to provide tonight's RAB Subcommittee meeting with an overview of some future issues the County foresees, as the agency responsible for overseeing MCAS El Toro. She said that today she received a fax from Mr. Gary Simon of the Local Reuse Authority stating that he would be unable to send the gentleman from GeoSyntec to the

Subcommittee meeting. She said she relayed her displeasure to all five County Supervisors and also spoke personally with Supervisor Chuck Smith regarding this issue. She stated that if she does not hear from Mr. Simon in the next three to five days, she may make a public announcement of the County's unwillingness to provide this overview. She said that anything that she or Gail Reavis talks about with the five County Supervisors is from the perspective of the MCAS El Toro RAB and the concerns for cleanup of the Station. She also wants to make sure that cleanup is done under the Department of Defense's budget not the County of Orange budget. She said she would inform the RAB of Mr. Simon's rationale when she finds out.

Ms. Rudolph listed other issues that are of concern to the RAB Subcommittee:

- The Subcommittee requested a map of the soil and/or water "baseline" study sites, and is very interested in seeing that map, she did not recall seeing one.
- She added that there are issues regarding elevated radionuclide readings and if they are naturally occurring. Ms. Rudolph asked if there is data or a study available that shows definitely the two different sets of radionuclide data from the different labs so that the data correlates. She said that the Subcommittee does not want to compare apples and oranges. Also, they would like to know how the different samples were collected and stored.
- There is still a concern with total maximum daily limits (TMDLs), particularly those that relate to the washes at Site 25. She said that even though there was a no further action determination for Site 25, the Navy still needs to address the TMDL issues.
- The Subcommittee is examining chemical "daughters" and breakdown products or manufactured byproducts for the substances detected on-base. Dr. Michael Brown, consultant to the City of Irvine, stated that the concern is if specific breakdown products are used as a guide to cleanup not just the primary products such as TCE and 1,1-DCE. The Subcommittee will be checking Dr. Bennett's notes and e-mails to provide further detail on this issue.
- The Subcommittee is interested in information on the data from the soil vapor extraction (SVE) at the VOC Source Area at Site 24. Specifically, the Subcommittee would like to know if the decreases that are occurring in the VOC Source Area are also occurring at the toe of the plume 3 miles off-base, and how monitoring at the toe of the plume is conducted.

NEW BUSINESS

◆ Regulatory Agency Comment Update

Nicole Moutoux, Project Manager, U.S. Environmental Protection Agency (EPA) Region IX

Ms. Moutoux was not in attendance to provide an U.S. EPA update. Mr. Gould said that three letters from U.S. EPA were provided on the sign-in table for RAB members. He said he would be happy to relay any comments or concerns to her and that RAB members can contact her directly with any questions.

Triss Chesney, Project Manager, Cal-EPA Dept. of Toxic Substances Control (DTSC)

Ms. Chesney said that there are a few changes taking place at DTSC. She said that the Unit Chief position she reports to is now open but is expected to be filled in December 2001. Until that position is filled, she will be reporting to another supervisor who reports to Mr. John Scandura, the Branch Chief.

Ms. Chesney stated that she has three letters available on the information table. The first letter contains comments on the Draft Technical Memorandum for the Phase II Evaluation of Radionuclides in Groundwater at the Former Landfill Sites and the EOD Range. She said comments from the California Department of Health Services, request more information regarding the basis for selecting filtered or unfiltered samples for the stable isotope analysis. The second letter contains comments on the Draft Site Closure Report, Vadose Zone Remediation for Site 24 the VOC Source Area. DTSC is asking for additional information regarding the Vadose Zone Remediation, and is also asking for additional monitoring. She said that she had the same general comments for additional information on vadose zone remediation and additional monitoring apply in the third letter that addresses the Draft Final Phase II Focused Feasibility Study for Site 16.

Patricia Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (RWQCB)

Ms. Hannon said that there are six letters from the RWQCB are available on the information table this evening.

Ms. Hannon stated that she had several comments on the 30% Design Submittal for Landfill Sites 2 and 17. Comments include requests for the Navy to: (1) go back and re-evaluate the modeling using an unsaturated model; (2) expand on the detail in some sections of the Design Submittal, including dust and erosion control during construction; and (3) specify the types of plant materials used to re-seed and be allowed to re-invade the cap and this should be incorporated into the modeling for a balance between the water going in and coming out to ensure the cap is effective. Ms. Hannon recommended that RAB attendees read through the comments as they are fairly extensive.

Ms. Hannon said that she has reviewed both the Environmental Baseline Survey for IRP Site 1 and the federal agency-to-federal agency property transfer, and has no comments on either document. She said that she has a few comments on the Site Closure Report for the Vadose Zone at Site 24, and is currently in discussion with the Navy on how to proceed at this site. There are also a few comments on the Draft Final Phase II Focused Feasibility Study for OU-3, Site 16. She has also reviewed the Former Silver Recovery Unit, Buildings 133 and 486 and concurred with the No Further Action.

Discussion

Dr. Brown asked what is the reason for RWQCB's request for the change in the modeling for the 30% Design Submittal. Ms. Hannon replied that Southern California does not get enough rain to use the saturated model, so she recommended use of the unsaturated model. She added that RWQCB sent letters in 1997-98 regarding this modeling, so this is actually a request for a response to comments from several years ago.

Mr. Bob Woodings, RAB member, asked if a saturated model is more conservative. Ms. Hannon replied that she does not have that information. She added that the unsaturated model is the one that is acceptable to RWQCB.

◆ Nomination Process – Dr. Chuck Bennett Memorial Award – Dean Gould

Mr. Gould stated that the RAB has agreed to provide an award every November to the RAB member who is truly committed and goes the extra mile. He asked that members provide names of candidates for this award by the end of October, so the award can be ready in November. Mr. Hurley will be the person to contact with these nominations.

◆ Installation Restoration (IR) Program Sites Overview, Dean Gould

Mr. Gould said that he will be providing an update on the IR Program, the Radiological Survey and the Compliance Program.

Mr. Gould stated that the basic steps under the CERCLA Program for the IR sites are as follows:

- Preliminary Assessment/Site Inspection (PA/SI)
- Remedial Investigation (RI) (includes Risk Assessment)
- Feasibility Study (FS)
- Proposed Plan
- Record of Decision (ROD)
- Remedial Design/Remedial Action (RD/RA) (if further action is necessary)

Mr. Gould said that some steps currently taking place at MCAS El Toro are a little outside the formal CERCLA process, but are critical to the overall program. Specifically, this includes the Radiological Survey that is currently underway. If necessary, radiological remediation will be conducted for any anomalies that are still in questions after sampling. A determination will then be made on how to close out the sites, and a Radiation Report will be prepared for agency review.

Mr. Gould stated that MCAS El Toro originally had 885 Locations of Concern (LOCs). To date, no further action has been reached on 723 of these LOCs (approximately 80% of the base). Installation Restoration Program (IRP) sites are included in this list. IRP sites are organized into general categories called operable units or OUs. Sites that comprise OUs are organized such that they require similar approaches and cleanup activities.

- OU-1 (Site 18) – consists of VOC contamination in the regional groundwater and the contamination extends approximately 3 miles off-Station.
- OU-2A (Site 24, the VOC Source Area and Site 25, Major Drainage Channels) – Site 24 is the source of the VOC groundwater contamination. In 1997, a Record of Decision (ROD) was signed for Site 25 by the BRAC Cleanup Team that called for No Further Action (NFA).
- OU-2B (Sites 2 and 17) and OU-2C (Sites 3 and 5) – Inactive landfill sites with municipal-type and construction debris waste.
- OU-3 (Sites 1, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 21 and 22) – Consists of all remaining sites not included in the other operable units. In September 1997, an NFA ROD was signed for Sites 4, 6, 9, 10, 13, 15, 19, 20, 21 and 22. In September 1999, a ROD was signed for Site 11. In June 2001, a NFA ROD was signed for Sites 7 and 14.

OU-1/OU-2A (Sites 18 and 24 Groundwater) – Mr. Gould stated that the settlement agreement was signed by the Department of Navy (DON), the Irvine Ranch Water District (IRWD), the Orange County Water District (OCWD), and the Department of Justice (DOJ). Mr. Bell added that on

September 18, 2001, the IRWD attorney received the fully executed settlement agreement, and OCWD received the fully executed agreement on September 17, 2001.

Mr. Bell said that both IRWD and OCWD are very excited that progress is being made on this program. He explained that one of three consulting firms that will be assisting with program implementation has been hired, and that firm will handle siting of the wells before drilling. The firm of Black and Veatch, the Engineer of Record for 10 years, has also been retained to help with pre-implementation activities and development of an implementation schedule. He said the water districts will be meeting with the Navy in early October, and soon thereafter would like to meet with the BCT on the FFA deliverables to determine turnaround times for each of the agencies. He explained that IRWD and OCWD are partners, and once OCWD is satisfied with all documentation, it will go to the Navy and then the regulatory agencies for review and comment. The request for proposal (RFP) process for hiring the hydrogeologist and the design engineer for the project will also start soon.

Mr. Bell said that one challenge they are facing is how to deal with well installation, which involves a discharge of water, and may require a discharge permit specifying constituent concentrations and monitoring requirements. The major concern is proximity to the Newport Bay watershed which contains salts and elevated nitrates. He explained that an additional concern is to prevent VOCs in the plume from being discharged to the creek during well installation. A possible way around the discharge requirement would be to convert a pipeline to discharge to the Orange County Sanitation District sewer system during well installation, thus avoiding discharge to the creek. He added that this issue will still need to be discussed with the Navy and the regulatory agencies. There is also some uncertainty of the water quality, so once the wells are built before the system design is finalized, the membranes that are used to treat the groundwater will undergo testing.

Mr. Gould added that the Navy plans to meet with the water districts and all key contractors in October 2001, with the regulatory agencies joining the meetings shortly thereafter. He said that the water districts will be preparing the deliverable documents, but the Navy will still be responsible to meet the necessary deadlines.

Mr. Gould stated that now a Proposed Plan will be prepared that will focus on the groundwater at Site 24 and the regional aquifer at Site 18. He explained that the Site 24 vadose zone soils would not be included. He said that once that ROD is in place, the design will be completed, and then construction and implementation can move forward.

OU-2A/Site 24, VOC Source Area – The Site 24 vadose zone soil will be addressed in a separate Final ROD. An Interim ROD for soil vapor extraction SVE cleanup was signed in 1997. Earth Tech, Inc., a Navy contractor, has the lead for the SVE effort at Site 24 and has had great success in mass removal of constituents. The Navy is currently working with the BCT on final closeout issues, such as Building 307 and the solvent study. The Draft Closure Report for the VOC Source Area was submitted to the BCT in June 2001 and the Navy and regulatory agencies are currently working toward concurrence. The next step will be to finalize the Closure Report and the ROD.

OU-2B, Landfill Sites 2 and 17 – The 30% Design Submittal received a lot of comments which are being reviewed and incorporated into the 60% Design Submittal. The 60% Design Submittal, however, is not a public deliverable as spelled out in the Federal Facilities Agreement (FFA), it will be reviewed internally and shared with the BCT and other agencies involved in the coordination of

the Alton Parkway Extension. The 90% Design Submittal, which is a public deliverable, is scheduled for February 2002.

OU-2C/Sites 3 and 5 – The Draft Final ROD is on hold awaiting completion of the Radiological Survey. Once the Navy has the Final Radiological Release Report, a determination will be made on how the survey affects the two landfills. Then the ROD can be finalized.

OU-3/Sites 8, 11 and 12 – Pertains to the Defense Reutilization and Marketing Office (DRMO) storage yard, another storage yard, and the site of the former industrial waste treatment plant. Mr. Gould said that the Navy is looking at a reevaluation of the human health risk associated with these sites. A technical memo has been submitted to the BCT for review, and comments should be back in early October. He said that sites 8 and 12 based, however, are pending because of the Radiological Survey. Site 11 has been separated from this group since it was not included in the Radiological Survey.

OU-3/Site 16 – A Focused Feasibility Study (FFS) and Draft Proposed Plan were submitted to the BCT for review. Substantial comments were received from the BCT and are being incorporated into the Final FFS. Some progress was made today at the BCT meeting, but some follow-up discussion will still be necessary. He said that the next step will be the ROD, then the Remedial Design and the Remedial Action.

OU-3/Site 1 – The Draft Final Ordnance Explosives (OE) Work Plan will be developed in conjunction with the Remedial Investigation Work Plan. The Draft Final OE Work Plan is scheduled for submittal to the public in October 2001 for a 30-day public comment period. The document will present how OE will be handled if encountered during RI activities. Mr. Gould also added that there are groundwater perchlorate issues that need to be addressed at Site 1. Site 1 will follow the full CERCLA process as per the FFA.

Discussion

Ms. Rudolph asked that in regard to Site 2, is the Navy is still designing for the 100-year project flood for the Borrego Wash. Mr. Crispin Wanyoike, Earth Tech, Inc., stated that the 100-year project flood considerations are being incorporated into the design. Mr. Gould confirmed that if there if repairs are needed due to a flood that exceeds the 100-year flood project design, the Navy would be responsible for the necessary repairs.

Ms. Rudolph asked when construction would begin on the Alton Parkway Extension. Mr. Gould replied that for Site 2, he can only comment on the Navy's design and schedule for the remedy. However, Orange County has its own process for obtaining the proper permits and other documentation, hiring the necessary contractors, and getting the design and actual construction in place. Mr. Gould reiterated that the 90% Design Submittal will be issued to the public in February 2002, followed by issuance of the final design and final Record of Decision (ROD) for Sites 2 and 17. It will be late 2002 before the Navy can actually begin construction of the landfill cap. Mr. Don Whittaker, RPM for SWDIV, explained that construction will have to be scheduled around the gnatcatcher mating season as well as the rainy season, leaving a very narrow window of opportunity. He added that the Navy is working to bring the remedial contractor on board at the 60% Design Submittal stage.

Ms. Rudolph asked if that information is being shared with the City of Lake Forest. Mr. Gould replied that information is shared with the City of Lake Forest and the County of Orange at the ongoing meetings that are held with these agencies. He added that a meeting is planned for October 7, 2001 to meet with these entities to review the project.

Mr. Bell asked if the surface of the landfill going to be planted with coastal sage for the gnatcatcher habitat. Mr. Whittaker replied that the Radiological Survey required removal of all vegetation except for certain areas (2 of the 27 acres) that the U.S. Fish and Wildlife said could not be disturbed. Mr. Bell asked if the cap will be allowed to revegetate. Mr. Whittaker replied that this is being considered in the design. Mr. Bell asked who will be doing the ongoing post-closure maintenance. Mr. Gould stated that it would typically be a firm under contract with the Navy.

Mr. Peter Hersh, RAB member, asked what will be the County's role in regard to Sites 2 and 17. Mr. Gould replied that language in the Interim ROD requires that the Navy coordinate with the County regarding landfill design and construction and the County's construction project for the Alton Parkway Extension. Mr. Hersh asked that the Integrated Waste Management Board and the OCHCA/LEA for landfills get copies of the 60% Design Submittal. He explained that the 30% and 90% Design Submittals are required deliverable documents while the 60% Design Submittal is not. It serves as an additional step for the Navy to ensure internally that everything is being appropriately coordinated. Steven Sharp, RAB member representing the OCHCA/LEA requested a copy of the 60% Design Submittal, Mr. Gould agreed to provide a copy.

In regard to Site 1, Dr. Brown asked if perchlorates are a soil issue. Mr. Gould replied that the remedial investigation will determine the extent of perchlorate impact at the site.

Ms. Rudolph asked if there had been a change to the "action" level for perchlorates. Mr. Wanyoike said that the currently accepted (interim) state action level is 18 parts per billion (ppb), while the federal (U.S. EPA) interim action level is 32 ppb. A proposal for a 5 ppb action level is still undergoing internal review by both state and federal regulatory agencies and that this issue has not yet been finalized.

◆ **Update on Tank 555 and Tech Memo on Closure of on Station JP-5 Fuel Pipeline Components – Dhananjay Rawal, IT Corporation**

Compliance Program Update

Mr. Rawal stated that five tanks and all associated piping have been removed from service, and sampling has been conducted around and beneath the tanks. Two pilot bioventing tests, a soil air permeability test and an *in-situ* (in place) respirometry (ISR) test, were performed September 10-18, 2001. The air permeability test utilized two bioventing wells, DD1 and DD2. He explained that a truck-mounted air compressor unit was put together to inject compressed air into the ground with helium as a tracer. He said that the purpose of the testing was to establish the radius of influence at each of eight monitoring points. The monitoring points were spaced at 10 feet, 25 feet and 50 feet from the injection point, and the pressure transducers at each monitoring point fed data to data loggers on all the pressure changes continuously during the tests. The data will be incorporated into a report, and the results from the permeability test will be used to determine the location of new wells for a full-scale bioventing system.

Mr. Rawal said that the ISR test was conducted as part of the pilot test. He explained that bioventing is an *in-situ* method for cleaning hydrocarbon contaminated soil in the vadose zone. This process enhances the oxygen in the vadose zone soil by injecting air. The injected air provides oxygen to the bacteria that then breaks down the contamination. The bacterial breakdown can be further enhanced by adding nutrients, such as nitrogen gas. This pilot test will provide information on the level of oxygen that is needed for the bacteria to biodegrade the contamination. If there is not enough bacteria in the soil, nitrogen gas can be added to increase the population of bacteria in the soil.

Mr. Rawal said that the goal of the pilot test is to collect all the data from the data loggers and prepare a report. Then, based on the data, develop a plan for installing the new extraction wells for a full-scale bioventing system. He explained that the pilot test used helium gas as a tracer, flow meters and pressure gauges that measure the pressure as air is injected into the soil. Data loggers collect data throughout the tests and it is downloaded into computers. There are various monitoring points, both shallow and deep that are connected to the data loggers.

JP-5 Pipeline

Mr. Rawal said that the fuel was delivered to Tank Farm 555 from the Norwalk pipeline, and was then delivered to various locations (tank farms, truck filling stations, airport fueling stations, etc.) on-Station wherever it was needed. He explained that there were two pipelines, primary and secondary. The primary pipeline carried fuel from Tank Farm 555 to other underground storage tanks (USTs). The secondary pipeline delivered fuel from the USTs to a transfer station, such as a truck or aircraft fueling station. He said that the Navy is handling the closure of the on-Station pipeline, and that Defense Fuels Supply Agency is handling the closure of the Norwalk pipeline. Mr. Hurley pointed out that a portion of the Norwalk pipeline is actually on the base, and that this portion of the Norwalk pipeline connects to Tank Farm 555 and even though it on-Station, it is not the responsibility of the Navy but the soil around it is.

Mr. Rawal said that the primary fuel lines that supplied fuel from Tank Farm 555 to other USTs have been closed. After closure, the line was cleaned, hydro-tested in segments, and by state fire marshal requirements were closed using cement slurry as a filler. Mr. Hersh asked if slurry used for closure was liquid or solid. Mr. Rawal replied that it is a solid. Mr. Bell asked if any testing /borings had been done along those lines. Mr. Rawal said that the testing done was required by the State Fire Marshal, and any section of the pipeline that failed the hydro-test would be further evaluated and sampling around the pipeline. He explained that only one section failed the hydro-test and will be further evaluated. Mr. Bell asked if any historical research of maintenance records was done to identify leaks in the past. Mr. Rawal said that the records show that the line has not required repair at any time in the past.

Mr. Rawal said that there are more than 7,200 feet of secondary pipeline. The next step for this pipeline is to continue removal of fuel, clean the line, and perform pressure testing. Nitrogen gas will be used to pressure test the pipeline in segments. He explained that this testing will be conducted with the State Fire Marshal observing on site. If any section of the pipeline fails the pressure test, a strategy will be developed to sample around the pipeline and that strategy will be sent to the oversight regulatory agency for approval before actual sampling is conducted. Mr. Rawal showed pictures of the pipeline. He said that field verification to locate the lines was completed in August 2001. Removal of remaining fuel via vacuum truck is to be completed in September 2001.

Cleaning and pressure testing of the lines using nitrogen gas and closure of the secondary pipelines is scheduled for October through December 2001.

Discussion

Mr. Bell asked if testing of bioventing equipment has been done prior to the pilot study. Mr. Rawal explained that this equipment has been used previously and that the are pilot tests at Tank Farm 555 are being done to provide information on the soil conditions at the site before building the full-scale bioventing system is installed. Mr. Bell asked how much of the area is effected by the plume? Mr. Rawal stated that they have drilled all around the tanks and collected soil data and most of the contamination is around Tank 550. The rest of the tanks do not have contamination leaching from them. Mr. Bell asked if there is any contamination outside the fence. Mr. Rawal said that no contamination was detected outside the fence, but contamination is present in the vadose zone soil from approximately 10 to 30 feet deep. Mr. Bell asked if contamination goes down to the water table. Mr. Rawal replied that there are seven monitoring wells in that area, and the three monitoring wells are downgradient from Tank Farm 555, including the main monitoring well that shows no contamination is present in the groundwater. Mr. Bell asked if there were any additives in the fuel at this location. Mr. Rawal explained that fuels were stored here and distributed all over the base, and that there were no additives added to the fuel stored at Tank Farm 555. Mr. Bell asked if groundwater sampling included testing for any potential fuel additives like alcohol. Mr. Rawal replied analytical testing covered all the suites for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) and that JP-5 does not contain additives like MTBE.

Mr. Bell stated that he is not interested in the typical sample analysis suite and asked that the manufacturer of JP-5 be contacted to find out specifically what is added to the fuel. A check needs to be done to see if those additives were included in the sample analysis. Mr. Rawal explained that the lab analysis will look for any traces of additives or fuel components that could be chemicals of concern that are related to JP-5. Mr. Wanyoike stated that the JP-5 fuel probably contained some very low levels of glycols to stop icing of fuels at high altitudes. He explained that according to his information, the fuel contained less than one-tenth of one percent of additives.

Mr. Rick Reavis, RAB meeting attendee, asked if the five tanks that will be closed in place have been purged. Mr. Rawal replied that the tanks have been cleaned and there is no remaining fuel in the tanks. The tanks will be backfilled with inert material. Mr. Reavis asked if the tanks could be used in the future. Mr. Gould replied that the system is being disabled, and all the associated piping removed. Mr. Gould added that he is unable to comment on whether the tanks would be seismically suitable or within code for use in the future. The Navy's intent is to close the tanks in place. Mr. Reavis asked that if other tanks have been removed why then are these tanks being abandoned in place. Mr. Rawal replied that the tanks are steel-lined and were constructed such that they were placed on large concrete slabs with a cover constructed over the top of the tank. The top of the tank is 4 to 5 below the surface and covered with soil. Basically, bunker-type tanks were constructed such that if they were bombed they would not explode, therefore they are very difficult to remove. Mr. Rawal added that there have been other instances on base where tanks have been closed in place due to constraints on removal. Mr. Gould explained that tank closeout is still under consideration, but that the tanks would be filled with some type of inert material, possibly sand or slurry.

Ms. Reavis asked about the closeout procedures for the pipeline leading up to Tank Farm 555. Ms. Reavis added that it is her understanding that the pipeline will not be closed. Mr. Gould replied that the pipeline is not a BRAC issue, that Defense Fuels is handling both monitoring and closure of the

pipeline, and that there have been some substantial presentations on this issue at past RAB presentations. Mr. Hurley explained that there is a section of pipeline that is within the footprint of the base that will be transferred to the community with the property. Mr. Hurley said that the BRAC office is ignoring this pipeline because it is a Defense Fuels pipeline, although the soil around the pipeline is a BRAC issue. He said that he cautions the community that this is a dangerous loophole, and the community will eventually be receiving this property that contains a non-BRAC parcel. Mr. Gould explained that the pipeline is not being ignored, that Defense Fuels is monitoring it and responding to any potential problems. Ms. Kim Foreman, Public Participation Specialist from DTSC, suggested that the contact information for the Defense Fuels representative be available at the next meeting. Mr. Gould said that would be provided along with the minutes from the last Defense Fuels presentation at the next RAB meeting. Mr. Hersh asked that Defense Fuels also provide a periodic update on the pipeline. Mr. Gould said that is a reasonable request and that information would be provided in a periodic update.

Mr. Hersh said that around Tank Farm 550 there was mention of some leaks associated with that tank. Mr. Rawal replied that soil borings have been done around the perimeter of the tanks down to 40 feet and the only contaminated samples were in the vadose zone surrounding Tank 550. Mr. Hersh asked, if the primary and secondary pipelines have been closed, what is holding up closing the tanks themselves. Mr. Rawal replied that recommendations have been sent to OCHCA and the Navy is awaiting a response. Mr. Hersh asked what inert material is proposed for backfilling the tanks. Mr. Rawal said that no specific inert material has been proposed. OCHCA will make the decision on what inert material will be used. Mr. Hersh asked why OCHCA will be making that decision since this is not County property. Mr. Gould replied that OCHCA, in addition to the RWQCB, is the regulatory agency that has oversight for these closure issues. Mr. Gould added that since this is a petroleum site, a ROD will not be issued. Ms. Reavis asked that the RAB be kept informed of the progress on this site. Mr. Hersh requested that OCHCA make a presentation on the decisions that are made for Tank Farm 555, and for an update at the next RAB meeting. Mr. Gould added that Mr. Steven Sharp is the OCHCA representative and that his number is included on the RAB member list that can be provided to any interested RAB members.

Mr. Bell asked for data on where the groundwater samples were taken at Tank Farm 555. Mr. Rawal replied that there was only one section of the primary pipeline that failed the hydro test, and that section will be further analyzed.

◆ Radiological Survey Fieldwork Update – Dean Gould

Mr. Gould said that the Historical Radiological Assessment (HRA) was completed in May 2000. This assessment used record searches, interviews, and investigations to determine the 14 sites that would require further surveying. The Draft Radiological Survey Plan was developed from that assessment and went through a lengthy review process. The Survey Plan was finalized in January 2001, the contractor commenced the survey in June 2001 and it is scheduled for completion in October 2001. Currently, only Sites 1 and 17 still need to undergo the survey, so anyone who is interested in viewing the survey in progress needs to make arrangements soon.

Mr. Gould said that the survey is currently taking place at Site 1, the EOD range. He explained that Site 17, the landfill, is a sizeable IR site that has been saved for last because it will be a very challenging site. Site 17 has a lot of rugged terrain and that will require hand-held surveying. Surveying of some of the habitat there requires coordination with the U.S. Fish and Wildlife

Department. Mr. Gould stated that several locations at the sites are candidates for sampling based on the survey and approximately 150 samples will be collected.

Mr. Gould stated that there is one correction to the handout, on the second bullet on slide . The Communications Station Landfill, IRP Site 17, including APHO 17, should read APHO 44.

Mr. Gould stated that there was a follow-on issue with the DRMO Buildings 319/360. Toys were apparently previously stored in or near these buildings. The Navy brought in a contractor on an emergency basis under the guidance of the Navy Radiological Affairs Support Office on the East Coast to thoroughly survey those buildings. The Navy and regulators will need to review the data collected and the way it was collected to see if it will meet the requirements of the current basewide survey. The results of the previous survey were non-detect indicating that the two buildings are clean. If the regulatory agencies feel the two surveys are not compatible, then the buildings would be surveyed again.

Completed Survey Sites

Former Industrial Waste Treatment Plant (IR Site 12) – covers approximately 4 acres and out of 450,000 data points there were 15 potential anomalies. Samples will be taken at the 15 anomaly areas to determine if any further sampling or remediation is necessary. (On the color maps in the handout, there is a breakdown between the tractor and the handheld backpack survey. The red areas where the potential anomalies were identified.)

Anomaly Area 3 - located adjacent to family housing where 625,000 data points were gathered and only one anomaly area was identified for sampling. Mr. Reavis asked if this anomaly area is a large data point? Mr. Gould replied that some anomalies may look to be a rather large, single point. However, the survey is taking multiple data points simultaneously, so it does not necessarily mean that the anomaly is that big. It simply provides an area that requires further sampling and helps to determine how many samples need to be collected. Mr. Whittaker added that with the eight detector array on the survey equipment, there is some ongoing overlap. Mr. Gould added that there is further overlap with the sweeps the equipment takes of the area, much like mowing a lawn. So there may be duplicate data points on the same potential anomaly.

Nuclear, Biological, Chemical Complex - 250,000 data points were gathered and 17 potential anomalies were identified. Mr. Gould said concrete forms are present on this site and some of these anomalies are directly adjacent to those structures, so there is a possibility that the concrete is the source of the anomaly. The follow-on backpack surveys will fill-in the areas that the tractor could not reach.

Aircraft Parts Yard - covers approximately a half-acre and 37,000 data points were gathered and four potential anomaly areas were identified. The concrete slab of the building foundation may be the source of the anomalies at this site.

Magazine Road Landfill - covers approximately 27 acres of which approximately 25 acres were surveyed. Due to the presence of some very steep, inaccessible terrain the entire site could not be surveyed. More than a million data points were gathered at this site with no specific anomalies identified but 30 samples will be collected at this site for analysis.

Summary - Mr. Gould stated that over 10 million data points were collected in all, and based on the survey data, roughly 150 samples will be collected. Approximately half the samples will be collected and analyzed to confirm soil characterization where the anomaly was only slightly above the investigation level. He further explained that based on the soil characterization, either additional sampling will be conducted, or remediation will take place, as necessary. He added that it may be necessary to issue a second close out report for those sites that require remediation. If that happens, the process starts again with development of a work plan. So, the Navy may issue a closure document on all sites that do not have issues, and then issue a separate closeout document for the other sites once necessary remediation is performed.

Discussion

Mr. Bell said that west of Site 2 there is a monitoring well that had elevated gross alpha levels after a heavy rains a few years ago. He recommended that the radiological survey include that well. Mr. Gould said that there was a previous RAB discussion about the radionuclide investigation and a possible link between Sites 2 and 5. Mr. Wanyoike stated that the historical data has been investigated for trends for gross alpha, gross beta, and uranium concentrations, and though there was an increase in concentrations, they have since come back down and remained relatively stable. If a similar spike occurs, samples will be collected to determine if that spike is naturally occurring. He said that all the data to date indicate that radionuclides are naturally occurring on the Station, so this could be an artifact of the soil at Site 2. Mr. Wanyoike further explained that the Radiological Survey only investigates the first 18 inches of soil.

◆ Draft Work Plan Installation Restoration Program Site 2 Aquifer Test – Crispin Wanyoike, Earth Tech, Inc.

Mr. Wanyoike said that IRP Site 2 is a landfill site of approximately 27 acres that is located within the Borrego Canyon Wash. Previous investigations conducted at this site include a remedial investigation that addressed the groundwater and soil. Also, a Feasibility Study was prepared that presented the remedial alternatives for both the groundwater and soil. He said that the preferred remedy for soil at the site is the monolithic cap, and the initial preferred remedy for the groundwater was monitored natural attenuation for the TCE and PCE plumes. However, when the groundwater remedy was presented to the regulators in the ROD, they commented that there was inadequate evidence of natural attenuation. As a result, the groundwater remedy was pulled and an interim ROD was finalized and signed addressing only the soil remedy. The current aquifer testing will provide data to support the natural attenuation groundwater remedy.

Mr. Wanyoike stated that the highest concentration in the PCE plume has been 8 micrograms per liter and in the TCE plume 150 micrograms per liter. The Site 2 plumes are relatively small compared to the Site 24 plume. He explained that the evaluation from the remedial investigation suggests that natural attenuation is occurring, but there is not enough data to support that conclusion. The current investigation's goals also include collecting data to provide a better estimate of the overall extent of the plumes. The downgradient extents of the TCE and PCE plumes have been delineated, but the upgradient extents have not been fully investigated. The investigation is also intended to provide data on aquifer properties to see what kind of extraction rates the wells can produce. The groundwater extracted during the aquifer tests will be analyzed to provide data on how much TCE and PCE can be removed from the groundwater. The previous investigation at this site indicates that degradation products for TCE and PCE are present, which suggests that that natural attenuation is

occurring. However, other indicators of natural attenuation are not present in the groundwater. He said that the data collected during these tests will be used to develop the final groundwater remedy for the site, either monitored natural attenuation or a more active remediation.

Mr. Wanyoike stated that they will be collecting groundwater samples from most of the existing wells. Data will be collected on dissolved oxygen (DO) and the oxygen reduction potential (ORP) to tell us what is happening in the groundwater, if natural attenuation is occurring. Hydropunch wells will be installed to help delineate the plumes. For the PCE plume, a hydropunch sample will be collected from the center of the plume to confirm the vertical extent of the plume. To delineate the upgradient extent, a hydropunch sample will be collected at the upgradient edge of the plume. For the TCE plume, hydropunch samples will be collected to confirm the downgradient extent and to determine the vertical and upgradient extent of the plume. He said that during the last round of sampling, the highest concentrations of TCE came from the most upgradient sample, so there may be an upgradient source. Hydropunch samples from two specific locations will be collected to help make this determination. He added that each hydropunch location will be converted to a piezometer for use during the aquifer testing and to monitor water levels during extraction. Extraction will take place over six months from six of the existing extraction wells. Starting with the most upgradient well, each well will extract groundwater until the level has stabilized and this process will proceed with the next downgradient well in a sequential manner. Samples will be collected and the remaining extracted groundwater will be collected in a Baker tank and treated with granular activated carbon system prior to discharge. Mr. Wanyoike explained that they will be gathering data on transmissivity and hydraulic conductivity. This will determine the capture zone and radius of influence for each extraction well as well as the mass removal rates. The data collected will provide better plume delineation and if either passive remediation or natural attenuation is occurring, or if active remediation with pump, treat and discharge would be the preferred groundwater remediation alternative.

Schedule

Mr. Wanyoike said that a Draft Work Plan was submitted to the regulatory agencies and comments are expected back later this month or in early October 2001 and the document will be finalized. Initial field work (hydropunch installation) and groundwater sampling will begin in November 2001. Groundwater extraction will take place for six months, ending in May 2002. A technical memorandum summarizing all the results is scheduled for submittal in August 2002. A recommendation on the preferred groundwater remedy will also be provided.

Discussion

Dr. Brown asked what is being used to assess the rate of natural attenuation. Mr. Wanyoike replied that dissolved oxygen and the oxidation reduction potential are plugged into a bio-plume model to estimate how quickly the plume will degrade naturally. Also, the size of the plume will be monitored to determine if it is shrinking in size along with the monitoring of concentrations of the degradation products for TCE and PCE. These are the indicators that will be used to assess the extent natural attenuation of the plume. Dr. Brown stated that some of the degradation products are also manufacturing by-products so how can it be determined if these are truly degradation products. Mr. Wanyoike replied that looking at historical trends, if decreases in TCE and PCE concentrations are seen and an increase in concentrations of the degradation products over time are not from an additional source, then the conclusion would be that natural attenuation is occurring. The data evaluated so far suggests that natural attenuation is occurring.

Mr. Bell asked if monitoring also includes the end products of degradation such as vinyl chloride? Mr. Wanyoike confirmed that this is the case. Mr. Bell asked what concentration are you seeing for TCE. Mr. Wanyoike replied that for TCE the highest concentration has been 152 micrograms per liter, and that is present in one location. Mr. Bell asked if this concentration was found at one specific interval. Mr. Wanyoike replied this was found in the most upgradient well at a screening interval of 110 feet and that the extent of the plume may actually be larger than previously thought. The two upgradient hydropunch samples will help determine the actual extent of the plumes. He emphasized that the downgradient extent of the plumes has been delineated so delineating of only the upgradient extent is being done.

Mr. Woodings asked if Site 24 is the source of the contamination at Site 2. Mr. Wanyoike replied that the source of these plumes is not from Site 24. Mr. Bell speculated that drums may have been dumped at the site may have caused the contamination. Mr. Wanyoike explained that Areas C1 and C2 at the Site 2 will ultimately be removed and placed in the former operational area of the landfill so that they will not continue to degrade in the aquifer.

Mr. Bell asked if testing for these plumes has included a whole suite of contaminants. Mr. Wanyoike replied that as part of the remedial investigation, the U.S. EPA method 8260 analysis was used. TCE and PCE were the only industrial constituents of concern based on that analysis.

◆ **RAB Meeting Participation**

Mr. Gould encouraged RAB members to let others know about the RAB meetings. He further emphasized that RAB members should try to bring other interested community members to the meetings.

MEETING EVALUATION AND FUTURE TOPICS

Meeting evaluation by RAB members:

No suggestions were provided regarding tonight's meeting.

Suggestions for future presentation topics include:

- Update on the progress of the soil vapor extraction at Site 24 and its relation to the plume off-site.
- Response to the Solvent Study.
- Update on Building 307.
- Update on the Radiological Survey.
- Overview of where there was suspicion of leaks in the jet fuel pipelines JP-5, and what soil gas surveys, hydropunch samples or well monitoring were conducted related to these suspected leaks.
- Sites 18 and 24 Irvine DeSalter Program Draft Proposed Plan.

Mr. Gould stated that regarding the response to the Solvent Study, Navy contractors are conducting sampling this week, so he will be unable to provide a presentation for the next RAB meeting. The samples need to go to a lab for analysis, and then the results will be summarized and presented to the BCT and RAB. He said he will provide updates as the process progresses.

Ms. Foreman stated that there appears to be some miscommunications regarding Tank Farm 555. She asked that a presentation on non-IRP issues stating who provides oversight on these issues would be beneficial. She added that this is a key issue that needs some clarification for RAB attendees.

CLOSING ANNOUNCEMENTS/FUTURE MEETING DATES

Upcoming RAB Meeting and Public Meeting

The next RAB meeting will be held on November 28, 2001 in the regular meeting location – Irvine City Hall, Conference and Training Center (CTC), One Civic Center Plaza, Irvine.

Recent RAB Subcommittee Meetings

- Wednesday, 9/19/01, at Room L-104, Irvine City Hall, before the RAB meeting.

The RAB Subcommittee has regularly scheduled meetings at the Irvine City Hall every other month at 5:00 p.m. on the same day as the RAB meeting in Room L-104. Additional meetings are also held, on an as needed basis, at other locations at the Irvine City Hall.

The 53rd meeting of the MCAS El Toro Restoration Advisory Board was adjourned at 9:14 p.m.

Attachments:

- Sign-in sheets from 9/19/01 RAB meeting.

Handouts provided at the meeting:

- RAB Meeting Agenda/Public Notice – 9/19/01 RAB meeting.
- Meeting Minutes from the July 25, 2001 RAB Meeting – 52nd RAB.
- MCAS El Toro RAB Meeting Schedule, Full RAB and RAB Subcommittee (Sept. 2001 – July 2002).
- MCAS El Toro RAB Mission Statement and Operating Procedures.
- RAB Membership Application – MCAS El Toro RAB.
- MCAS El Toro Installation Restoration Program – Mailing List Coupon.
- MCAS El Toro Administrative Record File - Information Sheet (for on-Station access).
- MCAS El Toro Information Repository - Information Sheet.
- MCAS El Toro Where To Get More Information Sheet.
- Internet Access – Environmental Web Sites.
- MCAS El Toro Marine Corps/Navy RAB Co-Chair (address, telephone, fax, e-mail).
- MCAS El Toro - For More Information on Redevelopment.
- MCAS El Toro RAB Acronyms and Glossary of Technical Terms.
- MCAS El Toro RAB Upcoming Major Documents (July 2001).
- MCAS El Toro Base Realignment and Closure Business Plan, Introduction Section, March 2001.
- MCAS El Toro Environmental Compliance Program Documentation Update (July 2001).
- *Presentation* – Installation Restoration Program Status Update, MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Dean Gould, BEC MCAS El Toro.
- *Presentation* – Compliance Program Update (Tank Farm 555), MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Dhananjay Rawal, IT Corporation.
- *Presentation* – Status of Radiological Surveys, MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Dean Gould, BEC MCAS El Toro (on behalf of Bruce Christensen, Roy F. Weston, Inc.)
- *Presentation* – Aquifer Test, IRP Site 2, MCAS El Toro Restoration Advisory Board Meeting, September 19, 2001, Presented by Crispin Wanyoike, Earth Tech Inc.

RAB Subcommittee Handouts and Letters

- No RAB Subcommittee handouts were provided for handout at the 9/19/01 RAB meeting.

Agency Comments and Letters - U.S. Environmental Protection Agency (U.S. EPA)

- U.S. EPA Comments on the Draft Technical Memorandum Phase II Evaluation of Radionuclides in Groundwater at the Former Landfill Sites and EOD Range, Marine Corp Air Station, El Toro - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated August 14, 2001).
- U.S. EPA Comments and Review on the Draft Site Closure Report, Vandose Zone Remediation IRP Site 24, Marine Corps Air Station, El Toro - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project manager, U.S. EPA (letter dated August 14, 2001).
- U.S. EPA Comments on Draft Proposed Plan for Site 16, Marine Corps Air Station, El Toro - To: Dean Gould BEC, MCAS El Toro; From: Nicole G. Moutoux, Remedial Project Manager, U.S. EPA (letter dated August 16, 2001).

Agency Comments and Letters - California Environmental Protection Agency (Cal-EPA)

- Cal-EPA, Department of Toxic Substances Control (DTSC) - Draft Site Closure Report, Vandose Zone Remediation, Operable Unit (OU) 2A, IRP Site 24, Volatile Organic Compound (VOC) Source Area, MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated August 13, 2001).
- Cal-EPA, Department of Toxic Substances Control (DTSC) - Draft Final Phase II Focused Feasibility Study, Operable Unit (OU) 3, Installation Restoration Program (IRP) Site 16, Crash Crew Training Pit No. 2, MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Triss M. Chesney, Remedial Project Manager, DTSC (letter dated August 17, 2001).

Agency Comments and Letters - California Regional Water Quality Control Board (RWQCB)

- California Regional Water Quality Control Board (RWQCB)- Comments on 30% Submittal Remedial Design Operable Unit 2B, Landfill Sites 2 and 17, former MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 7, 2001).
- RWQCB, Santa Ana Region - Comments on Draft Site-Specific Environmental Baseline Survey Report, IRP Site 1, Explosive Ordnance Disposal Range and Draft Federal Agency-To- Agency Property Transfer, Environmental Summary Documents For Certain Property (Parcel 5A2), MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro; From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 13, 2001).
- RWQCB, Santa Ana Region - Comments on Draft Site Closure Report, Vandose Zone Remediation, Volatile Organic Compound Source Area, IR Site 24, MCAS El Toro - To: Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 20, 2001).
- RWQCB, Comments on Draft Final Phase II Focused Feasibility Study Report, OU-3, Site 16, Former MCAS El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated August 27, 2001).
- RWQCB, Comments on Summary Report on Former Silver Recovery Unit (SRU 3B) at Building 133, Former MCAS, El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated September 10, 2001).
- RWQCB, Comments on Summary Report on Former Silver Recovery Unit (SRU) Number 3A, Building 46, Former MCAS, El Toro - To Dean Gould, BEC, MCAS El Toro, From: Patricia A. Hannon, Project Manager, Santa Ana Regional Water Quality Control Board (letter dated September 10, 2001).

Copies of all past RAB meeting minutes and handouts are available at the MCAS El Toro Information Repository, located at the Heritage Park Regional Library in Irvine. The address is 14361 Yale Avenue, Irvine; the telephone number is (949) 551-7151. Library hours are Monday through Thursday, 10 am to 9 p.m.; Friday and Saturday, 10 am to 5 p.m.; Sunday 12 p.m. to 5 p.m. [See next page for Internet sites.]

Internet Sites

Navy and Marine Corps Internet Access – Naval Facilities Engineering Command, Southwest Division, Environmental Web Sites (includes RAB meeting minutes)

www.efdswnavfac.navy.mil/environmental/evnhome.htm

Department of Defense – Environmental Cleanup Home Page Web Site

<http://www.dtic.mil/envirodod/index.html>

Department of Defense - Environmental BRAC Web Site

www.dtic.mil/envirodod/brac/

Defense Environmental Response Task Force Web Page

www.dtic.mil/envirodod/bracderf.html

Department of Defense- Community Involvement RAB Web Site

www.dtic.mil/envirodod/rab/

U.S. EPA Superfund Web Page

www.epa.gov/superfund/index.html

**MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 19, 2001**

RAB MEMBER SIGN-IN SHEET

Name	Signature	Name	Signature
Bell, Richard	<i>Richard Bell</i>	Moutoux, Nicole	⊛
Britton, George		Marquis, Roland	
Chesney, Triss	<i>Triss M. Chesney</i>	Marquis, Suzanne	
Crompton, Chris		Matheis, Mary Aileen	
Farber, Dr. Joseph	<i>Dr. Joseph Farber</i>	Mathews, Thomas	
Gould, Dean – Co-Chair	<i>Dean Gould</i>	Meier, Fred J.	⊛
Hannon, Patricia	<i>Patricia Hannon</i>	Olquin, Richard	
Herndon, Roy	⊛	Reavis, Gail	<i>Gail Reavis</i>
Hersh, Peter	<i>Peter Hersh</i>	Rudolph, Marcia	<i>Marcia Rudolph</i>
Hurley, Greg – Co-Chair	<i>Greg Hurley</i>	Sharp, Steven	<i>Steven Sharp</i>
James, Novel	<i>RESIGNED AS RAB MEMBER</i>	Werner, Jerry	
Jung, Dan		Woodings, Bob	<i>Bob Woodings</i>
		Zweifel, Donald E.	

⊛ = Excused Absence

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 19, 2001

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
LORI DUBASH	BNI/BECHTEL	MCAS-TUSTIN	(949) 847-6352	
DON WHITTAKER	SWDIN		(619) 532-0791	
Ray Ouellette	Mission Viejo Res.	Mission Viejo, CA	(949) 261-1577	—
LEN ALLEN	NINYO & MOORE	-	(949) 472-5444 (949) 472-5445	—
Kim Foreman	DTSC			
Scott KEHE	CSO EL TORO	MCAS EL TORO	949 726-2506	

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

**MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 19, 2001**

**NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests**

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	<u>COMPLETE MAILING ADDRESS</u> [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
MICHAEL BROWN	CITY OF IRVINE	P.O. Box 19575 Irvine, CA	949-724-6365	
Dhananjay Rawal	IT Corp	22 3347 Michelson Dr Suite 200, IRVINE CA 92614	949-660-7576 949-474-8309	NO
Polin Modanlou	County of Orange	10 Civic Center Plaza Santa Ana, CA 92867	949-262-0423	NO
RICK REAVIS	City of Mission Viejo	81281 Astoria MISSION VIEJO, CA 92692	949-461-0064	NO

New Attendees
will be added
to the MCAS
El Toro
Mailing List.

MCAS EL TORO
RESTORATION ADVISORY BOARD MEETING
September 19, 2001

NON-RAB MEMBER SIGN-IN SHEET
Other Attendees, Guests

NAME <u>PLEASE PRINT CLEARLY</u>	AFFILIATION	COMPLETE MAILING ADDRESS [STREET NUMBER, STREET NAME, CITY, STATE, ZIP CODE]	PHONE FAX	INTERESTED IN RAB MEMBERSHIP?
BOB COLEMAN	NavyCLEAN Bechtel	1230 Columbia St. Suite 400 San Diego, CA 92121	619-744-3016 619-687-8787	_____
CRISPIN WANDYDIKE	EARTH TECH	100 W. BROADWAY SUITE 240 LONG BEACH CA 90802	562 951 2057 562 951-2087	

Minutes of the El Toro Technical Review Committee

May 30, 2001

The meeting was called to order by Marcia Rudolph. All attendees introduced themselves. (List Appended). The minutes of the 21 March 2001 were approved as written.

Marcia reviewed the status of various documents and the comments that she will make at the El Toro RAB meeting following the adjournment of this technical committee.

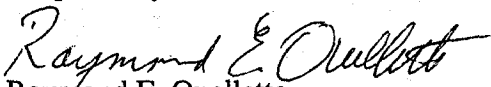
Members were asked to review documents. The following assignments were made:

- Review Final ROD for Sites 7 & 14 (Ray)
- Request an inventory of records that are available from Technical committee membership (Ray)
- Look at Groundwater Monitoring Report 12 Historical Data for Trend Analysis (Rich, Roy and Ray)
- Look into Statistical Analysis of Background Radiation analysis (Ray)
- Review Navy's response to City of Irvine Solvent when received (Paul LaBonte)

Issues to be looked into include the relationship between Site 2 and 5 soil and groundwater analyses

The next Technical Review Committee meeting will take place at 5:00 pm in the Irvine City Hall before the next RAB meeting that is scheduled for 25 July 2001 at 6:30 PM in Irvine City Hall.

Respectfully submitted,


Raymond E. Ouellette
Secretary

TECHNICAL REVIEW COMMITTEE
EL TORO RAB

ATTENDEES

MEETING DATE 05/30/01

	Present	e-mail	Telephone	Fax
Marcia Rudolph	X	Rudolphm@svusd.k12.ca.us Rudolphm@earthlink.net	949 461-3400 949 8309816 (h)	714 461-3511 949 830-4698 (h)
Jerry Werner	X	Jbwer@gateway.net	949 859-1322	-
Gail Reavis		RickgailR@home.com	949 461-0020	949 461-0064
Peter Hersh		Phersh@ci.irvine.ca.us	949 724-6456	949 724-6045
Raymond E. Ouellette	X	Rayouellette@kennedyjenks.com	949 261-1577	949 261-2453
Richard Bell		Bell@irwd.com	949 453-5582	949 453-0228
Roy Herndon		Rherndon@ocwd.com	714 378-3260	714 378-3369
Mike Brown	X	Mikbrown@concentric.net		
Rich Olquin		Rolquin@msn.com	949 716-3384	949 643-5207
Len Allen		Lallen@ninyoandmoore.com	949 472-5444	949 472-5445
Scott Kurtz		Skurtz@ninyoandmoore.com	949 472-5444	949 472-5445
Other Attendees				
Joe Farber		Jofarber@pacbell.net	949 724-6365	949 724-6440
Greg Hurley	X	Gregory.Hurley@KutakRock.com	940 719-2289	949 718-6708
Don Zweifel		Zweifel@earthlink.net	714 937-3240	
Pete Murphy		Pmurphy@kennedyjenks.com	949 567-2116	949 261-2134
Roger vonButow	X	Rvonbutow@aol.com	949 497-4816	Cleanwaternow.com
John Adams	X	John.s.adams@home.com	949 488-0110	949 488-0804
Mailing List				
Dean Gould		Goulda@efds.navfac.navy.mil	(619) 532-4155	(619) 532-4160
R. Coleman		Rbcolema@bechtel.com	(619) 744-3016	(619) 687-8787

MCAS El Toro -- Meeting Schedule
Restoration Advisory Board (RAB)
Full RAB and RAB Subcommittee Meetings

September 2001 – July 2002

RAB Meetings: The Conference and Training Center (CTC) at Irvine City Hall is being reserved for RAB meetings (full RAB) on the last Wednesday of the month, dates are listed below. **Time: 6:30 – 9:00 p.m.**

* Please note that due to the Yom Kippur holiday (begins on Sept. 26th at sundown), the September 2002 RAB meeting and Subcommittee will be on September 19th.

RAB Subcommittee Meetings: Subcommittee meetings will now be on the *SAME DAY* as the full RAB meeting from 5 to 6:00 p.m. in a smaller room. The preferred room is by the Council Chambers, Room L-104. **General Meeting Time: 5:00 – 6:00 p.m. (Room is available from 4:30 to 6:30 p.m.)**

RAB and Subcommittee Meeting Dates	RAB Meeting Room – Conference and Training Center (CTC) 6:30 – 9:00 p.m.	Subcommittee Meeting Room – Room L-104 5:00 – 6:00 p.m.
September 19, 2001	CTC	Room L-104
November 28, 2001	CTC	Room L-104
January 30, 2002	CTC	Room L-104
March 27, 2002	CTC	Room L-104
May 29, 2002	CTC	Room L-104
July 31, 2002	CTC	Room L-104

MARINE CORPS AIR STATION EL TORO
Installation Restoration Program
Restoration Advisory Board Mission Statement and Operating Procedures

This "Marine Corps Air Station (MCAS) El Toro, Installation Restoration Program, Restoration Advisory Board (RAB), Mission Statement and Operating Procedures," replaces the Revised Version dated January 31, 1996. This revised document contains a new section on the RAB Subcommittee, which replaces the old section. The new section is based on modifications made and approved by a majority vote of the RAB members present at the April 21, 1999 RAB meeting with further refinements made at the May 26, 1999 RAB meeting. Modifications incorporated resulted in revising the subcommittee structure so there is now only one RAB subcommittee. (Note: the original Mission Statement document was dated and signed on February 28, 1995.)

The Restoration Advisory Board (RAB) mission statement and operating procedures, herein referred to as "the mission statement and operating procedures", is entered into by the following parties; U. S. Marine Corps (USMC); U. S. Environmental Protection Agency (USEPA), Region 9; California Department of Toxic Substances Control (DTSC), Region 4; and the RAB. Marine Corps Air Station (MCAS) El Toro has developed a Community Relations Plan (CRP) which outlines the community involvement program. The RAB supplements the community involvement effort. A copy of the CPP is available at the information repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714.

I. Mission Statement of the RAB

a. The mission of the RAB is to promote community awareness and obtain timely constructive community review and comment on proposed environmental restoration actions to accelerate the cleanup and property transfer of MCAS El Toro. The RAB serves as a forum for the presentation of comments and recommendations to USMC, Remedial Project Managers (RPMS) of USEPA, and DTSC.

II. Basis and Authority for this Mission Statement and Operating Procedures

a. This mission statement and these operating procedures are consistent with the Department of Defense (DoD), USEPA Restoration Advisory Board Implementation Guidelines of September 27, 1994, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendment and Reauthorization Act (SARA) of 1986, particularly Sections 120 (a), 120 (f), 121 (f), and 10 U.S.C. 2705, enacted by Section 211 of SARA, and September 9, 1993, DoD policy letter entitled, "Fast Track Cleanup at Closing Installations".

III. Operating Procedures

A. Membership

1. All RAB members must reside in or serve communities within Orange County.
2. Members shall serve without compensation. All expenses incidental to travel and review inputs shall be borne by the respective members or their organization.
3. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB co-chairs, or fulfill member responsibilities including involvement in a subcommittee, the RAB co-chairs may ask the member to resign.
4. Members unable to continue to fully participate shall submit their resignation in writing to either of the RAB co-chairs.
5. Total membership in the RAB shall not exceed 50 members.
6. Applications for RAB membership vacancies shall take place as such vacancies occur. Applications will be reviewed and approved by the Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), USEPA, and DTSC along with consultation with the RAB community co-chair. Candidates will be notified of their selection in a timely manner.
7. Each RAB community member is considered equal whatever their position in the community, and has equal rights and responsibilities.

RAB Membership Responsibilities

- a. Actively participate in a subcommittee and review, evaluate, and comment on technical documents and other material related to installation cleanup, all assigned tasks are to be completed within the designated deadline date.
- b. Attend all RAB meetings.
- c. Report to organized groups to which they may belong or represent, and to serve as a mediator for information to and from the community.
- d. Serve in a voluntary capacity.

B. RAB Structure

1. The RAB shall be co-chaired by the MCAS El Toro BEC, and a community co-chair member. The BEC shall preside over the orderly administration of membership business.

2. A community co-chair will be selected by a majority vote of the RAB community members in attendance. Elected officials and government agency staff members of any legally constituted MCAS El Toro reuse groups are excluded from holding the community co-chair position. The community co-chair will be selected annually on the anniversary of the effective date of the agreement.

Community Co-Chair Responsibilities

a. Assure those community issues and concerns related to the environmental restoration/cleanup program are brought to the table.

b. Assist the USMC in assuring that technical information is communicated in understandable terms.

c. Coordinate with the BEC to prepare and distribute an agenda prior to each RAB meeting, and for the review and distribution of meeting minutes.

d. Assist subcommittees in coordinating and establishing meeting times/locations.

e. The community co-chair may be replaced by a majority vote of the RAB community members present at the meeting in which a vote is undertaken.

3. The RAB shall meet quarterly. More frequent meetings may be held if deemed necessary by the RAB co-chairs. The BEC will facilitate in the arrangement of the meetings and notify members of the time and location.

4. Agenda items will be compiled by the RAB co-chairs. Suggested topics should be given to the BEC or community co-chair no later than two (2) weeks prior to the meeting. The BEC shall be responsible for providing written notification to all RAB members of the upcoming agenda and supporting documents, at least two (2) weeks prior to the date, time, and place of scheduled RAB meeting.

5. The BEC shall be responsible for recording and distribution of meeting minutes. Also, the BEC shall collect a written list of attendees at each meeting, which will be incorporated into the meeting minutes. For quarterly meetings, the minutes will be distributed 30 days prior to the following meeting. For more frequent meetings, the minutes will be distributed as soon as possible.

6. A copy of the RAB meeting minutes will be sent to all RAB members. Supporting documents will be available for public review in the information repository and other repositories as identified.

7. RAB members will be asked to review and comment on various environmental restoration documents. Written comments may be submitted individually by a member, or by the RAB as a whole. Written comments will be submitted to the community co-chair on the subject documents within the schedule as provided for regulatory agency comments. The community

co-chair will consolidate comments from RAB members and provide all comments received to the BEC. The BEC will ensure that a written response is provided to the RAB in a timely manner.

RAB Subcommittee

8. On April 21, 1999, the RAB concurred that only one subcommittee is necessary to provide a concentrated focus on environmental cleanup issues. Therefore, the existing relevant subcommittees envisioned in the original "Mission Statement and Operating Procedures" dated February 28, 1995, have been dissolved, and incorporated into one subcommittee.

a. Membership on the subcommittee will be comprised of volunteers from the RAB, or may be selected by the BEC and the community co-chair.

b. The regular bimonthly RAB subcommittee meeting will continue to be scheduled for the last Wednesday of the month alternating with the regular meeting of the full RAB held at Irvine City Hall, Conference and Training Center, Irvine, California.

c. The subcommittee will set their own agendas and meetings and will be open to the public. The subcommittee chair will notify the BEC and community co-chair of all meeting times and places including additional subcommittee meetings other than the regularly scheduled bimonthly subcommittee meeting.

d. The subcommittee will elect a chair. The subcommittee membership may dismiss a subcommittee chair by a majority vote. Subcommittee chair removal is determined at the meeting where removal is addressed by majority vote of the RAB members present.

e. Membership on the subcommittee will include the RAB community co-chair.

f. Subcommittee status will be reviewed annually, in May, to determine if changes are needed or the continued existence is required.

g. The RAB subcommittee may establish ad hoc subcommittees for specific issues and purposes that would focus efforts on a short-term basis.

h. The subcommittee may request the participation, involvement, and advice of regulatory agency members.

9. MCAS El Toro has established an information repository for public documents relating to restoration activities at MCAS El Toro. The repository is located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, CA 92714. RAB members, as well as the general public, are authorized access to any documents, studies or information, which have been placed in the repository or distributed at RAB meetings. The community co-chair will be provided one (1) copy of all draft documents. The subcommittee will be provided up to seven (7) copies of draft documents.

IV. Effective Date and Amendments

a. The effective date of this mission statement and operating procedures shall be the date that the last signatory signs this mission statement and operating procedures.

b. This mission statement and operating procedures may be amended by a majority vote of the RAB members present. Amendments must be consistent with the MCAS El Toro Federal Facility Agreement (FFA), and the statues stated in Part 11 of the mission statement and operating procedures, (Basis and Authority for this Mission Statement and Operating Procedures).

V. Terms and Conditions

a. The terms and conditions of this RAB mission statement and operating procedures, and DONs endorsement thereof, shall not be construed to create any legally enforceable rights, claims or remedies against DON or commitments or obligations on the part of DON, and shall be construed in a manner that is consistent with CERCLA, 10 U.S.C. Section 2705, and 40 CFR Part 300.

VI. Termination

a. This mission statement and operating procedures will be terminated upon completion of requirements as stated in the FFA. However, after implementation of the final remedial design, it may be terminated earlier upon a majority vote of the RAB membership.

VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this _____ day of _____ 1995.

MCAS El Toro BRAC Environmental Coordinator

RAB Community Co-Chair

U. S. Environmental Protection Agency RPM

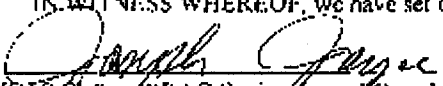
California Department of Toxic Substances Control RPM

The original "Mission Statement and Operating Procedures", dated February 28, 1995, is on file at Marine Corps Air Station (MCAS) El Toro, Environment and Safety. It was signed by Mr. Joseph Joyce, Base Realignment and Closure (BRAC), Environmental Coordinator (BEC), Ms. Marcia Rudolph, Restoration Advisory Board (RAB), Community Co-chair, Ms. Bonnie Arthur, Environmental Protection Agency (EPA), Remedial Project Manager, and Mr. Juan Jimenez, Department of Toxic Substances Control (DTSC), Remedial Project Manager.

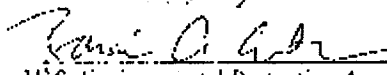
Shown below is an excerpt from the original "Mission Statement and Operating Procedures", dated February 28, 1995 with signatures of the above-mentioned individuals.

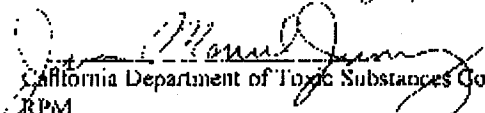
VII. Signatories to the Membership Mission Statement and Operating Procedures

IN WITNESS WHEREOF, we have set our hand this 28th day of FEBRUARY 1995


MCAS El Toro BRAC Environmental Coordinator


RAB Community Co-Chair


U.S. Environmental Protection Agency RPM


California Department of Toxic Substances Control
RPM

REVISED NOVEMBER 2001

MCAS EL TORO

Restoration Advisory Board - Membership Roster

Nicole Moutoux
U. S. Environmental Protection Agency
Region IX SFD-8-1
75 Hawthorne Street
San Francisco, CA 94105

Daytime (415) 972-3012
FAX (415) 947-3518

+Viola Cooper
Community Involvement Coordinator
U.S. EPA
75 Hawthorne Street (SFD-3)
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(415) 972-3243

Richard Bell
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Group Affiliation: Irvine Ranch Water District

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FAX (949) 453-0228
Home (714) 841-7809

**George Britton (Alternate for Tom Mathews)
P&DSD/Environmental & Project Services Div.
300 N. Flower Street
Santa Ana, CA 92703-5000
Group Affiliation: County of Orange

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Triss Chesney
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Cal-EPA/Dept. of Toxic Substances Control
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Chris Crompton
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Dr. Joseph Farber
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+Kim Foreman
Public Participation Specialist
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REVISED NOVEMBER 2001

RAB Marine Corps/Navy Co-Chair

Dean Gould
BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Div.
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Patricia Hannon
Santa Ana Regional Water Quality Control Board
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Peter Hersh
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Laguna Niguel, CA 92677

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RAB Community Co-Chair

Gregory F. Hurley, Esq.
Kutak Rock
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Roland Marquis
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Thomas B. Mathews

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REVISED NOVEMBER 2001

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Group Affiliation: American Society of Civil Engineers, Life Member Committee,
Infrastructure Advisory Committee

Rich Olquin
9 Breakers Lane
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Phone: (949) 716-3384
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Gail Reavis
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Group Affiliation: President, Palmia Anti-airport Coalition

Marcia Rudolph
24922 Muirlands #139
Lake Forest, CA 92630
Group Affiliation: Community Member

Daytime (949) 770-9555
Home (949) 830-9816
FAX (949) 830-4698

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Santa Ana, CA 92705

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FAX (714) 972-0749

Group Affiliation: Environmental Health Division, Orange County Health Care Agency

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Daytime (949) 859-1322
Home (949) 859-1322

Group Affiliation: Community Member/Leisure World

Bob Woodings
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Lake Forest, CA 92630

Daytime (949) 461-3481
FAX (949) 461-3512

Group Affiliation: Director of Public Works, City of Lake Forest

Donald E. Zweifel
266 Backs Lane. Condo B
Placentia, CA 92870

Home (714) 993-4085
FAX (714) 993-4085

Group Affiliation: Exec. Dir., Gulf & Vietnam Vets Historical Assn.

Footnotes: **George Britton serves as alternate for Tom Mathews (Orange County Environmental
Management Agency)

+Not RAB member but included on RAB member list.

MEMBERSHIP APPLICATION

MARINE CORPS AIR STATION EL TORO RESTORATION ADVISORY BOARD

Conditions for membership:

Restoration Advisory Board (RAB) members are expected to serve a two-year term and attend all RAB meetings or designate an alternate. The alternate must be jointly approved by the Department of Defense and Community Co-Chairpersons. If a member fails to attend two consecutive meetings without contacting the RAB, or at least one of the RAB Co-Chairs, or fulfill member responsibilities, which may include involvement with the subcommittee, the RAB Co-Chairs may ask the member to resign. Duties and responsibilities will include reviewing and commenting on technical documents and activities associated with the environmental restoration at **MARINE CORPS AIR STATION EL TORO**. Members will be expected to be available to community members and groups to facilitate the exchange of information and/or concerns between the community and the RAB.

RAB membership priority will be given to local residents that are impacted/affected by the closure of the installation. The number of RAB members is limited.

Name: _____

Address: _____
 Street Suite/Apt. # City Zip

Phone: () _____ () _____ () _____
 Daytime Home Fax

Group Affiliation: _____

1. Briefly state why you would like to be considered for membership on the Restoration Advisory Board (RAB).

(continued on back side)

2. What has been your experience working as a member of a diverse group with common goals?

- 3 Please indicate if you are interested in being considered for the Community Co-Chairperson position on the RAB by checking the space below:

Yes, I would like to be considered. ____

4. Are you willing to serve a two (2) year term as a member of this RAB?

Yes, I am willing- to serve for two (2) years. ____

5. By submitting this signed application, you are aware of the time commitment that this appointment will require of you.
6. By submitting this signed application, you willingly agree to work cooperatively with other members of the committee to ensure efficient use of time for addressing community issues related to environmental restoration of the Station.

Applicant Signature

Date

Please return your completed application to:

Dean Gould
BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
P.O. Box 51718
Irvine, CA 92619-1718

(949) 726-5398
FAX (949) 726-6586

San Diego office: (619) 532-0784

MCAS El Toro

Installation Restoration Program

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to:

Base Realignment and Closure
Attn: Environmental, Ms. Marge Flesch
P.O. Box 51718
Irvine, CA 92619-1718

- ☐ Add me to the MCAS El Toro Installation Restoration Program mailing list.
- ☐ Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____

Administrative Record File

- Located at MCAS El Toro – BRAC Office, Marine Way, Building 368, 2nd floor
- Anyone is welcome to review documents in the file
- To view the documents, schedule an appointment by calling:
 - Mr. Dean Gould at (949) 726-5398 or (619) 532-0784
 - Ms. Ms. Marge Flesch at (949) 726-5398

*See the backside for location of the
Information Repository*

Information Repository

- Located at Heritage Park Regional Library in Irvine
- Address: 14361 Yale Avenue, Irvine
- Hours: Monday-Thursday, 10 am to 9 pm
Friday and Saturday, 10 am to 5 pm
Sunday 12 pm to 5 pm
- Phone: (949) 551-7151
- Contains key Installation Restoration Program documents and complete materials from all RAB meetings (agendas, minutes, handouts)
- Anyone is welcome to review documents at the Library

Where To Get More Information:

Copies of Remedial Investigation reports, other key documents, and additional information relating to environmental cleanup activities at MCAS El Toro are available for public review at the following information repository:

Heritage Park Regional Library
14361 Yale Avenue
Irvine, CA
(949) 551-7151

Current hours:
Monday-Thursday 10am-9pm
Friday-Saturday 10am-5pm
Sunday 12pm-5pm

Key Project Representatives:

Mr. Dean Gould*
BRAC Environmental Coordinator
Base Realignment and Closure,
Environmental Division
MCAS El Toro
P.O. Box 51718
Irvine, CA 92619-1718
(949) 726-5398 or (619) 532-0784

Ms. Nicole Moutoux*
Project Manager
U.S. EPA Region IX
75 Hawthorne St. (SFD-H-8)
San Francisco, CA 94105
(415) 972-3012

Ms. Triss Chesney*
Project Manager
Cal-EPA, Department of Toxic
Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5395

Ms. Patricia Hannon*
Project Manager
Cal-EPA, Regional Water Quality
Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3338
(909) 782-4498

* BRAC Cleanup Team (BCT) Member

Ms. Viola Cooper
Community Involvement Coordinator
Superfund Division
75 Hawthorne Street (SFD-3)
San Francisco, CA 94105
U.S. EPA, Region IX
(415) 972-3243
(800) 231-3075

Ms. Kim Foreman
Public Participation Specialist
Cal-EPA, Department of Toxic
Substances Control
5796 Corporate Avenue
Cypress, CA 90630
(714) 484-5324

Navy and Marine Corps - Internet Access Environmental Web Sites

**N
E
W**

Southwest Division Naval Facilities Engineering Command Web Site:

<http://www.efdswnavfac.navy.mil.environmental/envhome.htm>

Department of Defense - Environmental Web Page

<http://www.dtic.mil/environdod/>

Department of Defense - Environmental BRAC Web Page

<http://www.dtic.mil/environdod/envbrac.html>

U.S. EPA Superfund Web Page

www.epa.gov/superfund/index.html

Marine Corps/Navy RAB Co-Chair

Dean Gould

BRAC Environmental Coordinator

Base Realignment and Closure, Environmental Division

P.O. Box 51718

Irvine, CA 92619-1718

(949) 726-5398

FAX (949) 726-6586

E-mail: goulddda@efdsw.navfac.navy.mil

San Diego phone and fax:

(619) 532-0784

FAX (619) 532-0780

For More Information on
MCAS El Toro Redevelopment

Mr. Gary Simon
Executive Director

MCAS El Toro
Local Redevelopment Authority
(714) 834-3000

Steven Sharp

Environmental Health Division
Orange County Health Care Agency

2009 East Edinger Avenue
Santa Ana, CA 92705

(714) 667-3623
FAX (714) 972-0749

Glossary of Technical Terms

Air Stripping: A treatment technology that transforms VOCs in groundwater to gas for removal and treatment.

Aquifer: A particular zone or layer of rock or soil below the earth's surface through which groundwater moves in sufficient quantity to serve as a source of water.

Cleanup Goals: Chemical concentration levels that are the goals of the remedial action. Once the cleanup goals have been achieved, the remedy is considered protective of human health and the environment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Commonly known as the Superfund. This law authorizes EPA to respond to past hazardous waste problems that may endanger public health and the environment. CERCLA was authorized and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Domestic Use: Use of water for drinking, cooking, and bathing.

Downgradient: Groundwater that is downstream of an area of soil or groundwater contamination.

Extraction Wells: Wells used to pump groundwater to the surface for treatment or for use.

Feasibility Study (FS): An analysis of cleanup or remedial alternatives to evaluate their effectiveness and to enable selection of a preferred alternative.

Federal Facility Agreement: A voluntary agreement entered into by the Navy, U.S. EPA, and Cal-EPA (Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB)) establishing an overall framework for how the investigation and cleanup of MCAS El Toro is to be conducted.

Groundwater: Underground water that fills pores in soil or openings in rocks.

Infiltration: Process by which dissolved chemical constituents are carried by water through the soil.

Intermediate Zone: A generally low permeability layer that separates that shallow groundwater unit from the principal aquifer at MCAS El Toro.

Maximum Contaminant Levels (MCLs): The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.

Maximum Contaminant Level Goal: A non-enforceable concentration of a drinking-water contaminant, set at a level at which no known adverse effects on human health occur.

Monitored Natural Attenuation: Refers to the routine sampling and testing of groundwater to assess the cleanup effectiveness of natural attenuation processes.

Monitoring Well: Wells drilled at specific locations either on or near a hazardous waste site, for the purpose of determining direction of groundwater flow, types and concentrations of contaminants present, or vertical or horizontal extent of contamination.

Natural Attenuation: The process by which a compound is reduced in concentration over time, through adsorption, degradation, dilution, and/or transformation.

Nitrates: Compounds containing nitrogen which dissolve in water and may have harmful effects on humans and animals. Nitrates are commonly used in fertilizers.

Operable Unit (OU): Term for each of a number of separate activities undertaken as part of a Superfund site cleanup.

Plume: A three-dimensional zone within the groundwater aquifer containing contaminants that generally move in the direction of, and with, groundwater flow.

Principal Aquifer: The main (regional) water-bearing aquifer in the vicinity of MCAS El Toro.

Rebound: The tendency of soil gas concentrations to increase after SVE is turned off.

Record of Decision (ROD): A public document that explains what cleanup alternative will be used at a specific NPL site. The ROD is based on information and technical analysis generated during the remedial investigation/feasibility study and consideration of public comments and community concerns.

Remedial Action (RA): The actual construction or implementation phase that follows the remedial design of the selected cleanup alternative at a Superfund site.

Remedial Design (RD): The design of the selected cleanup alternative for a Superfund site.

Remedial Investigation (RI): One of the two major studies that must be completed before a decision can be made about how to clean up a Superfund site. (The FS is the second major study.) The RI is designed to determine the nature and extent of contamination at the site.

Shallow Groundwater Unit: The shallowest water-bearing zone beneath MCAS El Toro.

Soil Gas: Gas found in soil pore space. In contaminated areas, soil gas may include VOCs.

Soil Vapor Extraction (SVE): A process whereby contaminated soil gas is brought to the surface for treatment.

Trichloroethene (TCE): A volatile organic compound that has been widely used as an industrial solvent. TCE is a colorless, odorless liquid that, when inhaled or ingested in large amounts, can cause irritation of the nose, throat, and eyes, nausea, blurry vision, or dermatitis. EPA has classified TCE as a "probable human carcinogen."

Total Dissolved Solids (TDS): Used to reflect salinity of groundwater.

Upgradient: Groundwater that is upstream of an area of soil or groundwater contamination.

Volatile Organic Compound (VOC): An organic (carbon containing) compound that evaporates readily at room temperature. VOCs are commonly used in dry cleaning, metal plating, and machinery degreasing operations.

Water Quality Standards: State-adopted and U.S. EPA-approved ambient standards for water bodies. The standards cover the use of the water body and the water quality criteria which must be met to protect the designated use or uses.

MCAS El Toro

Restoration Advisory Board

Acronyms and Glossary of Technical Terms

This handout has been prepared to provide Restoration Advisory Board (RAB) members and others with a better understanding of acronyms and technical terms used during Installation Restoration Program activities and other environmental programs underway at MCAS El Toro.

List of Acronyms

AB	Assembly Bill
accumulation areas	less-than-90-day accumulation areas
ACM	asbestos-containing materials
AC/S	Assistant Chief of Staff
AFB	Air Force Base
AOC	area of concern
AQMP	Air Quality Management Plan
AR	Administrative Record
ARAR	applicable or relevant and appropriate requirement
ASN	Assistant Secretary of the Navy
AST	aboveground storage tank
Basin	the Los Angeles Basin
BCP	BRAC Cleanup Plan
BCT	BRAC Cleanup Team
BEC	BRAC Environmental Coordinator
BFI	Browning Ferris Industries
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
BRAC III	Base Closure and Realignment Act of 1993
CAC	Citizens Advisory Committee
Cal-EPA	California Environmental Protection Agency
CBCEC	California Base Closure Environmental Committee
CCR	<i>California Code of Regulations</i>
CDM Federal	CDM Federal Programs Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	<i>Code of Federal Regulations</i>
CLEAN	Comprehensive Long-Term Environmental Action Navy
CMC	Commandant of the Marine Corps
COE	(United States) Army Corps of Engineers
COMCABWEST	Commander, Marine Corps Air Bases Western Area
COPC	chemical of potential concern
County	Orange County
CP	Compliance Program
CRP	Community Reuse Plan
CTO	Contract Task Order

List of Acronyms

D&M	Dames & Moore
DFSC	Defense Fuel Supply Center
the Districts	the County Sanitation Districts of Orange County
DoD	Department of Defense
DOI	Department of Interior
DoN	Department of the Navy
DRMO	Defense Reutilization and Marketing Office
DTSC	(Cal-EPA) Department of Toxic Substances Control
EBS	Environmental Baseline Survey
ECP	environmental condition of property
EE/CA	Engineering Evaluation/Cost Analysis
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EO	Environmental Office
EOD	explosive ordnance disposal
ETRPA	El Toro Reuse Planning Authority
°F	degrees Fahrenheit
FA	further action
FAA	Federal Aviation Administration
FDS	Federal Disposal Services
FFA	Federal Facility Agreement
FOSL	finding of suitability to lease
FOST	finding of suitability to transfer
FS	feasibility study
ft/day	feet per day
gal.	gallon
GIS	geographical information system
HAS	Homeless Assistance Submission
HRA	Historical Radiological Assessment
HUD	(United States Department of) Housing and Urban Development
IAFS	Interim Action Feasibility Study
IDW	investigation-derived waste
IRP	Installation Restoration Program
IRWD	Irvine Regional Water District
IT	International Technology Corporation
IWTP	industrial wastewater treatment plant
JMM	James M. Montgomery Engineers

LBP	lead-based paint
LDPE	low density polyethylene
LOC	location of concern
LRA	Local Redevelopment Authority
MAW	marine air wing
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
mg/L	milligrams per liter
MSL	mean sea level
NAVFAC	Naval Facilities
NAVFACENGCOM	Naval Facilities Engineering Command
NAVRAMP	Navy Radon Assessment and Mitigation Program
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEDTS	Navy Environmental Data Transfer Standards
NFA	no further action
NEPA	National Environmental Policy Act
NFI	no further investigation
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
OCHCA	Orange County Health Care Agency
OCWD	Orange County Water District
OEA	Office of Economic Adjustment
OHM	OHM Remediation Services Corporation
OSHA	Occupational Safety and Health Administration
OU	operable unit
OWS	oil/water separator
PAH	polynuclear aromatic hydrocarbon
PBR	Permit by Rule
PCB	polychlorinated biphenyl
pCi/L	picocuries per liter
PP	Proposed Plan
ppm	parts per million
PRG	preliminary remediation goal
Project Team	BRAC Project Team
PWC	Navy Public Works Center
QAPP	quality assurance project plan

List of Acronyms

RAB	Restoration Advisory Board
RAC	remedial action contract
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RECLAIM	Regional Clean Air Initiatives Market
RFA	RCRA Facility Assessment
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RWQCB	Regional Water Quality Control Board
SAIC	Science Applications International Corporation
SCAQMD	South Coast Air Quality Management District
SPCC	Spill Prevention and Countermeasure Plan
Station	Marine Corps Air Station El Toro
STP	sewage treatment plant
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU	solid waste management unit
TAA	temporary accumulation area
TCRA	time-critical removal action
TDS	total dissolved solids
TRC	Technical Review Committee
TSCA	Toxic Substances Control Act
UCL	upper confidence limit
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USMC	United States Marine Corps
UST	underground storage tank
VOC	volatile organic compound
WW	World War
XFMR	transformer

ACRONYMS/ABBREVIATIONS

Air SWAT	Air Quality Solid Waste Assessment Test
ASTM	American Society for Testing and Materials
BCT	BRAC Cleanup Team
BEIDMS	Bechtel Environmental Integrated Data Management System
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	U.S. EPA Contract Laboratory Program
CNDDB	California Natural Diversity Data Base
COPC	chemical of potential concern
CPT	cone penetrometer test
CTO	Contract Task Order
DC	direct current
DCE	dichloroethene
Desalter	Irvine Desalter Project
DoD	Department of Defense
DON	Department of the Navy
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
EC	electrical conductivity
EOD	explosive ordnance disposal
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FID	flame ionization detector
FS	Feasibility Study
FSP	Field Sampling Plan
ft/day	feet per day

ACRONYMS/ABBREVIATIONS (continued)

GC	gas chromatograph
gpm	gallons per minute
GPR	ground-penetrating radar
IAFS	Interim-Action Feasibility Study
IAS	Initial Assessment Study
ID	inside diameter
IDWMP	Investigation-Derived Waste Management Plan
IRP	Installation Restoration Program
L/min	liters per minute
µmhos/cm	micromhos per centimeter
MCAS	Marine Corps Air Station
MeCl	methylene chloride
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MSL	mean sea level
NACIP	Navy Assessment and Control of Installation Pollutants
NEESA	Naval Energy and Environmental Support Activity
NFESC	Naval Facilities Engineering Service Center (formerly NEESA)
NFRAP	No Further Response Action Planned
NPL	National Priorities List
NTU	nephelometric turbidity units
OCWD	Orange County Water District
OD	outside diameter
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
PRG	(U.S. EPA Region IX) Preliminary Remediation Goal
psi	per square inch
psig	per square inch gauge

ACRONYMS/ABBREVIATIONS (continued)

QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROICC	Resident Officer in Charge of Construction
RPD	relative percent difference
RWQCB	(California) Regional Water Quality Control Board
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SIPOA	Site Inspection Plan of Action
SOP	Standard Operating Procedure
SVE	soil vapor extraction
SVOC	semivolatile organic compound
SWDIV	Southwest Division Naval Facilities Engineering Command
SWMU/AOC	solid waste management unit/area of concern
TCA	trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TIC	The Irvine Company
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
USCS	Unified Soils Classification System
U.S. EPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VOA	volatile organic analysis
VOC	volatile organic compound
v/v	volume per volume
WSA	waste staging area

ACRONYMS/ABBREVIATIONS

ARAR	applicable or relevant and appropriate requirement
BCT	BRAC Cleanup Team
bgs	below ground surface
BNI	Bechtel National, Inc.
BRAC	Base Realignment and Closure
°C	degrees Celsius
Cal-EPA	California Environmental Protection Agency
CCR	<i>California Code of Regulations</i>
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (1980)
cfm	cubic feet per minute
CFR	<i>Code of Federal Regulations</i>
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm ³ /g	cubic centimeters per gram
cm/s	centimeters per second
CPT	cone penetrometer test
CTO	Contract Task Order
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense nonaqueous-phase liquid
DON	Department of the Navy
DTSC	(Cal-EPA) Department of Toxic Substances Control
DWR	(California) Department of Water Resources
°F	degrees Fahrenheit
FFA	Federal Facilities Agreement
FS	Feasibility Study
ft ³	cubic feet
ft/day	feet per day
ft ³ /min	cubic feet per minute
GAC	granular activated carbon
gpm	gallons per minute
HQ	hazard quotient
IAFS	Interim-Action Feasibility Study
ICE	internal combustion engine
IRP	Installation Restoration Program

ACRONYMS/ABBREVIATIONS (continued)

IRWD	Irvine Ranch Water District
Irvine Subbasin	Irvine Groundwater Subbasin
JMM	James M. Montgomery Engineers, Inc.
LGAC	liquid-phase granular activated carbon
LNAPL	light nonaqueous-phase liquid
MCAS	Marine Corps Air Station
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MSL	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NPW	net present worth
OCWD	Orange County Water District
OU	operable unit
PCE	tetrachloroethene
PCO	photocatalytic oxidation
POTW	publicly owned treatment works
PVC	polyvinyl chloride
RACER	Remedial Action Cost Engineering Requirements
RAO	remedial action objective
RBC	risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RI	Remedial Investigation
RWQCB	(California) Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act of 1986
SCAQMD	South Coast Air Quality Management District
SHSO	Site Health and Safety Officer
SITE	(U.S. EPA) Superfund Innovative Technologies Evaluation
STLC	soluble threshold limit concentration

ACRONYMS/ABBREVIATIONS (continued)

SVE	soil vapor extraction
SWDIV	Southwest Division Naval Facilities Engineering Command
SWRCB	(California) State Water Resources Control Board
TAL	target analyte list
TBC	to be considered
TCA	trichloroethane
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
USGS	United States Geological Survey
U.S. EPA	United States Environmental Protection Agency
UV	ultraviolet
VGAC	vapor-phase granulated activated carbon
VES	vapor extraction system
VOC	volatile organic compound
WQCP	(Comprehensive) Water Quality Control Plan (for the Santa Ana Region)



Terms Of Environment

Glossary, Abbreviations, And Acronyms



Introduction

Terms Of Environment defines in non-technical language the more commonly used environmental terms appearing in EPA publications, news releases, and other Agency documents available to the general public, students, the media, and Agency employees. The definitions do not constitute the Agency's official use of terms and phrases for regulatory purposes, and nothing in this document should be construed to alter or supplant any other federal document. Official terminology may be found in the laws and related regulations as published in such sources as the Congressional Record, Federal Register, and elsewhere.

The terms selected for inclusion are derived from previously published lists, internal glossaries produced by various programs and specific suggestions made by personnel in many Agency offices. The chemicals and pesticides selected for inclusion are limited to those most frequently referred to in Agency publications or that are the subject of major regulatory or program activities.

Definitions or information about substances or program activities not included herein may be found in EPA libraries or scientific/technical reference documents, or may be obtained from various program offices.

Those with suggestions for future editions should write to the Editorial Services Division, Office of Communications, Education, and Public Affairs, A-107, USEPA, Washington DC 20460.

Abbreviation and acronymn list begins on page 31

A

A—Scale Sound Level: A measurement of sound approximating the sensitivity of the human ear, used to note the intensity or annoyance level of sounds.

Abandoned Well: A well whose use has been permanently discontinued or which is in a state of such disrepair that it cannot be used for its intended purpose.

Abatement: Reducing the degree or intensity of, or eliminating, pollution.

Accident Site: The location of an unexpected occurrence, failure or loss, either at a plant or along a transportation route, resulting in a release of hazardous materials.

Acclimatization: The physiological and behavioral adjustments of an organism to changes in its environment.

Acid Deposition: A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the atmosphere, often far from the original sources, and then deposited on earth in either wet or dry form. The wet forms, popularly called "acid rain," can fall as rain, snow, or fog. The dry forms are acidic gases or particulates.

Acid Rain: (See: acid deposition)

Action Levels: 1. Regulatory levels recommended by EPA for enforcement by FDA and USDA when pesticide residues occur in food or feed commodities for reasons other than the direct application of the pesticide. As opposed to "tolerances" which are established for residues occurring as a direct result of proper usage, action levels are set for inadvertent residues resulting from previous legal use or accidental contamination. 2. In the Superfund program, the existence of a contaminant concentration in the environment high enough to warrant action or trigger a response under SARA and the National Oil and Hazardous Substances Contingency Plan. The term is also used in other regulatory programs. (See: tolerances.)

Activated Carbon: A highly adsorbent form of carbon used to remove odors and toxic substances from liquid or gaseous emissions. In waste treatment it is used to remove dissolved organic matter from waste water. It is also used in motor vehicle evaporative control systems.

Activated Sludge: Product that results when primary effluent is mixed with bacteria-laden sludge and then agitated and aerated to promote biological treatment, speeding the breakdown of organic matter in raw sewage undergoing secondary waste treatment.

Activator: A chemical added to a pesticide to increase its activity.

Active Ingredient: In any pesticide product, the component that kills, or otherwise controls, target pests. Pesticides are regulated primarily on the basis of active ingredients.

Activity Plans: Written procedures in a school's asbestos management plan that detail the steps a Local Education Agency (LEA) will follow in performing the initial and additional cleaning, operation and maintenance-program tasks; periodic surveillance; and reinspections required by the Asbestos Hazard Emergency Response Act (AHERA).

Acute Exposure: A single exposure to a toxic substance which results in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day, as compared to longer, continuing exposure over a period of time.

Acute Toxicity: The ability of a substance to cause poisonous effects resulting in severe biological harm or death soon after a single exposure or dose. Also, any severe poisonous effect resulting from a single short-term exposure to a toxic substance. (See: chronic toxicity, toxicity.)

Adaptation: Changes in an organism's structure or habits that help it adjust to its surroundings.

Add-on Control Device: An air pollution control device such as carbon absorber or incinerator that reduces the pollution in an exhaust gas. The control device usually does not affect the process being controlled and thus is "add-on" technology, as opposed to a scheme to control pollution through altering the basic process itself.

Adequately Wet: Asbestos containing material that is sufficiently mixed or penetrated with liquid to prevent the release of particulates.

Administrative Order On Consent: A legal agreement signed by EPA and an individual, business, or other entity through which the violator agrees to pay for correction of violations, take the required corrective or cleanup actions, or refrain from an activity. It describes the actions to be taken, may be subject to a comment period, applies to civil actions, and can be enforced in court.

Administrative Order: A legal document signed by EPA directing an individual, business, or other entity to take corrective action or refrain from an activity. It describes the violations and actions to be taken, and can be enforced in court. Such orders may be issued, for example, as a result of an administrative complaint whereby the respondent is ordered to pay a penalty for violations of a statute.

Administrative Procedures Act: A law that spells out procedures and requirements related to the promulgation of regulations.

Administrative Record: All documents which EPA considered or relied on in selecting the response action at a Superfund site, culminating in the record of decision for remedial action or, an action memorandum for removal actions.

Adsorption: An advanced method of treating waste in which activated carbon removes organic matter from wastewater.

Adulterants: Chemical impurities or substances that by law do not belong in a food, or pesticide.

Adulterated: 1. Any pesticide whose strength or purity falls below the quality stated on its label. 2. A food, feed, or product that contains illegal pesticide residues.

Advanced Treatment: A level of wastewater treatment more stringent than secondary treatment; requires an 85-percent reduction in conventional pollutant concentration or a significant reduction in non-conventional pollutants.

Advanced Wastewater Treatment: Any treatment of sewage that goes beyond the secondary or biological water treatment stage and includes the removal of nutrients such as phosphorus and nitrogen and a high percentage of suspended solids. (See primary, secondary treatment.)

Advisory: A non-regulatory document that communicates risk information to those who may have to make risk management decisions.

Aerated Lagoon: A holding and/or treatment pond that speeds up the natural process of biological decomposition of organic waste by stimulating the growth and activity of bacteria that degrade organic waste.

Aeration: A process which promotes biological degradation of organic matter in water. The process may be passive (as when waste is exposed to air), or active (as when a mixing or bubbling device introduces the air).

Aeration Tank: A chamber used to inject air into water.

Aerobic Treatment: Process by which microbes decompose complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. (Such processes include extended aeration, trickling filtration, and rotating biological contactors.)

Aerobic: Life or processes that require, or are not destroyed by, the presence of oxygen. (See: anaerobic.)

Aerosol: A suspension of liquid or solid particles in a gas.

Affected Public: The people who live and/or work near a hazardous waste site.

Afterburner: In incinerator technology, a burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odors. It may be attached to or be separated from the incinerator proper.

Agent Orange: A toxic herbicide and defoliant used in the Vietnam conflict, containing 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2,4-dichlorophenoxyacetic acid (2,4-D) with trace amounts of dioxin.

Agricultural Pollution: Farming wastes, including runoff and leaching of pesticides and fertilizers; erosion and dust from plowing; improper disposal of animal manure and carcasses; crop residues, and debris.

Agro-ecosystem: Land used for crops, pasture, and livestock; the adjacent uncultivated land that supports other vegetation and wildlife; and the associated atmosphere, the underlying soils, groundwater, and drainage networks.

AHERA Designated Person (ADP): A person designated by a Local Education Agency to ensure that the AHERA requirements for asbestos management and abatement are properly implemented.

Air Changes Per Hour (ACH): The movement of a volume of air in a given period of time; if a house has one air change per hour, it means that all of the air in the house will be replaced in a one-hour period.

Air Contaminant: Any particulate matter, gas, or combination thereof, other than water vapor. (See: air pollutant.)

Air Curtain: A method of containing oil spills. Air bubbling through a perforated pipe causes an upward water flow that slows the spread of oil. It can also be used to stop fish from entering polluted water.

Air Mass: A large volume of air with certain meteorological or polluted characteristics-e.g. a heat inversion or smogginess-while in one location. The characteristics can change as the air mass moves away.

Air Monitoring: (See: monitoring)

Air Plenum: Any space used to convey air in a building, furnace, or structure. The space above a suspended ceiling is often used as an air plenum.

Air Pollutant: Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into two main groups: (1) those emitted directly from identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation. Exclusive of pollen, fog, and dust, which are of natural origin, about 100 contaminants have been identified and fall into the following categories: solids, sulfur compounds, volatile organic chemicals, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compounds, and odors.

Air Pollution Episode: A period of abnormally high concentration of air pollutants, often due to low winds and temperature inversion, that can cause illness and death. (See: episode, pollution.)

Air Pollution Control Device: Mechanism or equipment that cleans emissions generated by an incinerator by removing pollutants that would otherwise be released to the atmosphere.

Air Pollution: The presence of contaminant or pollutant substances in the air that do not disperse properly and interfere with human health or welfare, or produce other harmful environmental effects.

Air Quality Criteria: The levels of pollution and lengths of exposure above which adverse health and welfare effects may occur.

Air Quality Control Region: An area designated by the federal government in which communities share a common air pollution problem, sometimes embracing several states.

Air Quality Standards: The level of pollutants prescribed by regulations that may not be exceeded during a given time in a defined area.

Air Stripping: A treatment system that removes volatile organic compounds (VOCs) from contaminated ground water or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Air Toxics: Any air pollutant for which a national ambient air quality standard (NAAQS) does not exist (i.e., excluding ozone, carbon monoxide, PM-10, sulfur dioxide, nitrogen oxide) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunctions, neurological disorders, heritable gene mutations, or other serious or irreversible chronic or acute health effects in humans.

Airborne Particulates: Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Chemical composition of particulates varies widely, depending on location and time of year. Airborne particulates include: windblown dust, emissions from industrial processes, smoke from the burning of wood and coal, and motor vehicle or non-road engine exhausts. exhaust of motor vehicles.

Airborne Release: Release of any chemical into the air.

Alachlor: A herbicide, marketed under the trade name Lasso, used mainly to control weeds in corn and soybean fields.

Alar: Trade name for daminozide, a pesticide that makes apples redder, firmer, and less likely to drop off trees before growers are ready to pick them. It is also used to a lesser extent on peanuts, tart cherries, concord grapes, and other fruits.

Aldicarb: An insecticide sold under the trade name Temik. It is made from ethyl isocyanate.

Algae: Simple rootless plants that grow in sunlit waters in proportion to the amount of available nutrients. They can affect water quality adversely by lowering the dissolved oxygen in the water. They are food for fish and small aquatic animals.

Algal Blooms: Sudden spurts of algal growth, which can affect water quality adversely and indicate potentially hazardous changes in local water chemistry.

Alternate Method: Any method of sampling and analyzing for an air pollutant that is not a reference or equivalent method but that has been demonstrated in specific cases to EPA's satisfaction to produce results adequate for compliance monitoring.

Alternative Remedial Contract Strategy Contractors: Government contractors who provide project management and technical services to support remedial response activities at National Priorities List sites.

Ambient Air Quality Standards: (See: Criteria Pollutants and National Ambient Air Quality Standards.)

Ambient Air: Any unconfined portion of the atmosphere: open air, surrounding air.

Anaerobic: A life or process that occurs in, or is not destroyed by, the absence of oxygen.

Anaerobic Decomposition: Reduction of the net energy level and change in chemical composition of organic matter caused by microorganisms in an oxygen-free environment.

Antarctic "Ozone Hole": Refers to the seasonal depletion of ozone in a large area over Antarctica.

Anti-Degradation Clause: Part of federal air quality and water quality requirements prohibiting deterioration where pollution levels are above the legal limit.

Applicable or Appropriate Requirements (ARARs): Any state or federal statute that pertains to protection of human life and the environment in addressing specific conditions or use of a particular cleanup technology at a Superfund site.

Aquifer: An underground geological formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Area of Review: In the UIC program, the area surrounding an injection well that is reviewed during the permitting process to determine if flow between aquifers will be induced by the injection operation.

Area Source: Any small source of non-natural air pollution that is released over a relatively small area but which cannot be classified as a point source. Such sources may include vehicles and other small engines, small businesses and household activities.

Aromatics: A type of hydrocarbon, such as benzene or toluene, added to gasoline in order to increase octane. Some aromatics are toxic.

Arsenicals: Pesticides containing arsenic.

Asbestos: A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. EPA has banned or severely restricted its use in manufacturing and construction.

Asbestos Abatement: Procedures to control fiber release from asbestos-containing materials in a building or to remove them entirely, including removal, encapsulation, repair, enclosure, encasement, and operations and maintenance programs.

Asbestos-Containing Waste Materials (ACWM): Mill tailings or any waste that contains commercial asbestos and is generated by a source covered by the Clean Air Act Asbestos NESHAPS.

Asbestosis: A disease associated with inhalation of asbestos fibers. The disease makes breathing progressively more difficult and can be fatal.

Asbestos Program Manager: A building owner or designated representative who supervises all aspects of the facility asbestos management and control program.

Ash: The mineral content of a product remaining after complete combustion.

Assessment: In the asbestos-in-schools program, the evaluation of the physical condition and potential for damage of all friable asbestos containing materials and thermal insulation systems.

Assimilation: The ability of a body of water to purify itself of pollutants.

Assimilative Capacity: The capacity of a natural body of water to receive wastewaters or toxic materials without deleterious effects and without damage to aquatic life or humans who consume the water.

Attainment Area: An area considered to have air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Attenuation: The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, and/or transformation.

Attractant: A chemical or agent that lures insects or other pests by stimulating their sense of smell.

Attrition: Wearing or grinding down of a substance by friction. Dust from such processes contributes to air pollution.

Availability Session: Informal meeting at a public location where interested citizens can talk with EPA and state officials on a one-to-one basis.

B

Background Level: In air pollution control, the concentration of air pollutants in a definite area during a fixed period of time prior to the starting up or on the stoppage of a source of emission under control. In toxic substances monitoring, the average presence in the environment, originally referring to naturally occurring phenomena.

BACT-Best Available Control Technology: An emission limitation based on the maximum degree of emission reduction (considering energy, environmental, and economic impacts) achievable through application of production processes and available methods, systems, and techniques. BACT does not permit emissions in excess of those allowed under any applicable Clean Air Act provisions. Use of the BACT concept is allowable on a case by case basis for major new or modified emissions sources in attainment areas and applies to each regulated pollutant.

Bacteria: (Singular: bacterium) Microscopic living organisms that can aid in pollution control by metabolizing organic matter in sewage, oil spills or other pollutants. However, bacteria in soil, water or air can also cause human, animal and plant health problems.

Baffle Chamber: In incinerator design, a chamber designed to promote the settling of fly ash and coarse particulate matter by changing the direction and/or reducing the velocity of the gases produced by the combustion of the refuse or sludge.

Baghouse Filter: Large fabric bag, usually made of glass fibers, used to eliminate intermediate and large (greater than 20 microns in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Baling: Compacting solid waste into blocks to reduce volume and simplify handling.

Ballistic Separator: A machine that sorts organic from inorganic matter for composting.

Band Application: The spreading of chemicals over, or next to, each row of plants in a field.

Banking: A system for recording qualified air emission reductions for later use in bubble, offset, or netting transactions. (See: emissions trading.)

Bar Screen: In wastewater treatment, a device used to remove large solids.

Barrier Coating(s): A layer of a material that obstructs or prevents passage of something through a surface that is to be protected, e.g. grout, caulk, or various sealing compounds; sometimes used with polyurethane membranes to prevent corrosion or oxidation of metal surfaces, chemical impacts on various materials, or, for example, to prevent radon infiltration through walls, cracks, or joints in a house.

Basal Application: In pesticides, the application of a chemical on plant stems or tree trunks just above the soil line.

Bed Load: Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

BEN: EPA's computer model for analyzing a violator's economic gain from not complying with the law.

Bench-scale Tests: Laboratory testing of potential cleanup technologies (See: treatability studies.)

Beryllium: An airborne metal hazardous to human health when inhaled. It is discharged by machine shops, ceramic and propellant plants, and foundries.

Best Available Control Measures (BACM): A term used to refer to the most effective measures (according to EPA guidance) for controlling small or dispersed particulates from sources such as roadway dust, soot and ash from woodstoves and open burning of rush, timber, grasslands, or trash.

Best Demonstrated Available Technology (BDAT): As identified by EPA, the most effective commercially available means of treating specific types of hazardous waste. The BDATs may change with advances in treatment technologies.

Best Management Practice (BMP): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources.

Bimetal: Beverage containers with steel bodies and aluminum tops; handled differently from pure aluminum in recycling.

Bioaccumulants: Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted. (See: biological magnification.)

Bioassay: Study of living organisms to measure the effect of a substance, factor, or condition by comparing before-and-after exposure or other data.

Biochemical Oxygen Demand (BOD): A measure of the amount of oxygen consumed in the biological processes that break down organic matter in water. The greater the BOD, the greater the degree of pollution.

Biodegradable: Capable of decomposing rapidly under natural conditions.

Biodiversity: Refers to the variety and variability among living organisms and the ecological complexes in which they occur. Diversity can be defined as the number of different items and their relative frequencies. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystem, species, and genes.

Biological Control: In pest control, the use of animals and organisms that eat or otherwise kill or out-compete pests.

Biological Magnification: Refers to the process whereby certain substances such as pesticides or heavy metals move up the food chain, work their way into rivers or lakes, and are eaten by aquatic organisms such as fish, which in turn are eaten by large birds, animals or humans. The substances become concentrated in tissues or internal organs as they move up the chain. (See: bioaccumulative.)

Biological Oxidation: Decomposition of complex organic materials by microorganisms. Occurs in self-purification of water bodies and in activated sludge wastewater treatment.

Biological Oxygen Demand (BOD): An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste.

Biological Treatment: A treatment technology that uses bacteria to consume organic waste.

Biologicals: Vaccines, cultures and other preparations made from living organisms and their products, intended for use in diagnosing, immunizing, or treating humans or animals, or in related research.

Biomass: All of the living material in a given area; often refers to vegetation.

Biome: Entire community of living organisms in a single major ecological area. (See: biotic community.)

Biomonitoring: 1. The use of living organisms to test the suitability of effluents for discharge into receiving waters and to test the quality of such waters downstream from the discharge. 2. Analysis of blood, urine, tissues, etc., to measure chemical exposure in humans.

Bioremediation: Use of living organisms to clean up oil spills or remove other pollutants from soil, water, or wastewater; use of organisms such as non-harmful insects to remove agricultural pests or counteract diseases of trees, plants, and garden soil.

Biosphere: The portion of Earth and its atmosphere that can support life.

Biostabilizer: A machine that converts solid waste into compost by grinding and aeration.

Biota: The animal and plant life of a given region.

Biotechnology: Techniques that use living organisms or parts of organisms to produce a variety of products (from medicines to industrial enzymes) to improve plants or animals or to develop microorganisms to remove toxics from bodies of water, or act as pesticides.

Biotic Community: A naturally occurring assemblage of plants and animals that live in the same environment and are mutually sustaining and interdependent. (See: biome.)

Blackwater: Water that contains animal, human, or food waste.

Blood Products: Any product derived from human blood, including but not limited to blood plasma, platelets, red or white corpuscles, and derived licensed products such as interferon.

Bloom: A proliferation of algae and/or higher aquatic plants in a body of water; often related to pollution, especially when pollutants accelerate growth.

BOD5: The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter.

Bog: A type of wetland that accumulates appreciable peat deposits. Bogs depend primarily on precipitation for their water source, and are usually acidic and rich in plant residue with a conspicuous mat of living green moss.

Boom: 1. A floating device used to contain oil on a body of water. 2. A piece of equipment used to apply pesticides from a tractor or truck. (See: sonic boom.)

Botanical Pesticide: A pesticide whose active ingredient is a plant-produced chemical such as nicotine or strychnine. Also called a plant-derived pesticide.

Bottle Bill: Proposed or enacted legislation which requires a returnable deposit on beer or soda containers and provides for retail store or other redemption. Such legislation is designed to discourage use of throwaway containers.

Bottom Ash: The non-airborne combustion residue from burning pulverized coal in a boiler; the material which falls to the bottom of the boiler and is removed mechanically; a concentration of the non-combustible materials, which may include toxics.

Bottom Land Hardwoods: Forested freshwater wetlands adjacent to rivers in the southeastern United States, especially valuable for wildlife breeding, nesting and habitat.

Brine Mud: Waste material, often associated with well-drilling or mining, composed of mineral salts or other inorganic compounds.

Building Cooling Load: The hourly amount of heat that must be removed from a building to maintain indoor comfort (measured in British Thermal Units BTUs).

Broadcast Application: The spreading of pesticides over an entire area.

Bubble Policy: (See: emissions trading.)

Bubble: A system under which existing emissions sources can propose alternate means to comply with a set of emissions limitations; under the bubble concept, sources can control more than required at one emission point where control costs are relatively low in return for a comparable relaxation of controls at a second emission point where costs are higher.

Buffer Strips: Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields.

Bulk Sample: A small portion (usually thumbnail size) of a suspect asbestos-containing building material collected by an asbestos inspector for laboratory analysis to determine asbestos content.

Bulky Waste: Large items of waste materials, such as appliances, furniture, large auto parts, trees, stumps.

Burial Ground (Graveyard): A disposal site for radioactive waste materials that uses earth or water as a shield.

By-product: Material, other than the principal product, generated as a consequence of an industrial process.

C

Cadmium (Cd): A heavy metal element that accumulates in the environment.

Cancellation: Refers to Section 6 (b) of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) which authorizes cancellation of a pesticide registration if unreasonable adverse effects to the environment and public health develop when a product is used according to widespread and commonly recognized practice, or if its labeling or other material required to be submitted does not comply with FIFRA provisions.

Cap: A layer of clay, or other impermeable material installed over the top of a closed landfill to prevent entry of rainwater and minimize leachate.

Capacity Assurance Plan: A statewide plan which supports a state's ability to manage the hazardous waste generated within its boundaries over a twenty year period.

Capture Efficiency: The fraction of organic vapors generated by a process that are directed to an abatement or recovery device.

Carbon Absorber: An add-on control device that uses activated carbon to absorb volatile organic compounds from a gas stream. (The VOCs are later recovered from the carbon.)

Carbon Adsorption: A treatment system that removes contaminants from ground water or surface water by forcing it through tanks containing activated carbon treated to attract the contaminants, contaminants.

Carbon Monoxide (CO): A colorless, odorless, poisonous gas produced by incomplete fossil fuel combustion.

Carboxyhemoglobin: Hemoglobin in which the iron is bound to carbon monoxide (CO) instead of oxygen.

Carcinogen: Any substance that can cause or aggravate cancer.

Carrier: The inert liquid or solid material added to an active ingredient in a pesticide.

Carrying Capacity: 1. In recreation management, the amount of use a recreation area can sustain without loss of quality. 2. In wildlife management, the maximum number of animals an area can support during a given period.

Cask: A thick-walled container (usually lead) used to transport radioactive material. Also called a coffin.

Catalytic Converter: An air pollution abatement device that removes pollutants from motor vehicle exhaust, either by oxidizing them into carbon dioxide and water or reducing them to nitrogen and oxygen.

Catalytic Incinerator: A control device that oxidizes volatile organic compounds (VOCs) by using a catalyst to promote the combustion process. Catalytic incinerators require lower temperatures than conventional thermal incinerators, thus saving fuel and other costs.

Categorical Exclusion: A class of actions which either individually or cumulatively would not have a significant effect on the human environment and therefore would not require preparation of an environmental assessment or environmental impact statement under the National Environmental Policy Act (NEPA).

Categorical Pretreatment Standard: A technology-based effluent limitation for an industrial facility discharging into a municipal sewer system. Analogous in stringency to Best Availability Technology (BAT) for direct dischargers.

Cathodic Protection: A technique to prevent corrosion of a metal surface by making it the cathode of an electrochemical cell.

Cells: 1. In solid waste disposal, holes where waste is dumped, compacted, and covered with layers of dirt on a daily basis. 2. The smallest structural part of living matter capable of functioning as an independent unit.

Cementitious: Densely packed and non-fibrous friable materials.

Central Collection Point: Location where a generator of regulated medical waste consolidates wastes originally generated at various locations in his facility. The wastes are gathered together for treatment on-site or for transportation elsewhere for treatment and/or disposal. This term could also apply to community hazardous waste collections, industrial and other waste management systems.

Centrifugal Collector: A mechanical system using centrifugal force to remove aerosols from a gas stream or to de-water sludge.

Channelization: Straightening and deepening streams so water will move faster, a marsh-drainage tactic that can interfere with waste assimilation capacity, disturb fish and wildlife habitats, and aggravate flooding.

Characteristic: Any one of the four categories used in defining hazardous waste: ignitability, corrosivity, reactivity, and toxicity.

Chemical Oxygen Demand (COD): A measure of the oxygen required to oxidize all compounds, both organic and inorganic, in water.

Chemical Treatment: Any one of a variety of technologies that use chemicals or a variety of chemical processes to treat waste.

Chemnet: Mutual aid network of chemical shippers and contractors that assigns a contracted emergency response company to provide technical support if a representative of the firm whose chemicals are involved in an incident is not readily available.

Chemosterilant: A chemical that controls pests by preventing reproduction.

Chemtec: The industry-sponsored Chemical Transportation Emergency Center; provides information and/or emergency assistance to emergency responders.

Chilling Effect: The lowering of the Earth's temperature because of increased particles in the air blocking the sun's rays. (See: greenhouse effect.)

Chlorinated Hydrocarbons: These include a class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain. Among them are DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene. Other examples include TCE, used as an industrial solvent.

Chlorinated Solvent: An organic solvent containing chlorine atoms, e.g., methylene chloride and 1,1,1-trichloromethane, used in aerosol spray containers and in highway paint.

Chlorination: The application of chlorine to drinking water, sewage, or industrial waste to disinfect or to oxidize undesirable compounds.

Chlorinator: A device that adds chlorine, in gas or liquid form, to water or sewage to kill infectious bacteria.

Chlorine-Contact Chamber: That part of a water treatment plant where effluent is disinfected by chlorine.

Chlorofluorocarbons (CFCs): A family of inert, nontoxic, and easily liquified chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere where their chlorine components destroy ozone.

Chlorosis: Discoloration of normally green plant parts caused by disease, lack of nutrients, or various air pollutants.

Cholinesterase: An enzyme found in animals that regulates nerve impulses. Cholinesterase inhibition is associated with a variety of acute symptoms such as nausea, vomiting, blurred vision, stomach cramps, and rapid heart rate.

Chromium: (See: heavy metals.)

Chronic Effect: An adverse effect on a human or animal in which symptoms recur frequently or develop slowly over a long period of time.

Chronic Toxicity: The capacity of a substance to cause long-term poisonous human health effects. (See: acute toxicity.)

Clarification: Clearing action that occurs during wastewater treatment when solids settle out. This is often aided by centrifugal action and chemically induced coagulation in wastewater.

Clarifier: A tank in which solids settle to the bottom and are subsequently removed as sludge.

Clay Soil: Soil material containing more than 40 percent clay, less than 45 percent sand, and less than 40 percent silt.

Clean Coal Technology: Any technology not in widespread use prior to the Clean Air Act amendments of 1990. This Act will achieve significant reductions in pollutants associated with the burning of coal.

Clean Fuels: Blends or substitutes for gasoline fuels, including compressed natural gas, methanol, ethanol, liquified petroleum gas, and others.

Cleanup: Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans and/or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Clear Cut: Harvesting all the trees in one area at one time, a practice that can encourage fast rainfall or snowmelt runoff, erosion, sedimentation of streams and lakes, flooding, and destroys vital habitat.

Cloning: In biotechnology, obtaining a group of genetically identical cells from a single cell; making identical copies of a gene.

Closed-Loop Recycling: Reclaiming or reusing wastewater for non-potable purposes in an enclosed process.

Closure: The procedure a landfill operator must follow when a landfill reaches its legal capacity for solid waste: ceasing acceptance of solid waste and placing a cap on the landfill site.

Coagulation: Clumping of particles in wastewater to settle out impurities, often induced by chemicals such as lime, alum, and iron salts.

Coastal Zone: Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea.

Coefficient of Haze (COH): A measurement of visibility interference in the atmosphere.

Coke Oven: An industrial process which converts coal into coke, one of the basic materials used in blast furnaces for the conversion of iron ore into iron.

Cold Temperature CO: A standard for automobile carbon monoxide (CO) emissions to be met at a low temperature (i.e. 20 degrees Fahrenheit). Conventional automobile catalytic converters are less efficient upon start-up at low temperatures.

Coliform Index: A rating of the purity of water based on a count of fecal bacteria.

Coliform Organism: Microorganisms found in the intestinal tract of humans and animals. Their presence in water indicates fecal pollution and potentially adverse contamination by pathogens.

Collector Sewers: Pipes used to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Combined Sewer Overflows: Discharge of a mixture of storm water and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

Combined Sewers: A sewer system that carries both sewage and storm-water runoff. Normally, its entire flow goes to a waste treatment plant, but during a heavy storm, the volume of water may be so great as to cause overflows of untreated mixtures of storm water and sewage into receiving waters. Storm-water runoff may also carry toxic chemicals from industrial areas or streets into the sewer system.

Combustion: 1. Burning, or rapid oxidation, accompanied by release of energy in the form of heat and light. A basic cause of air pollution. 2. Refers to controlled burning of waste, in which heat chemically alters organic compounds, converting into stable inorganics such as carbon dioxide and water.

Combustion Chamber: The actual compartment where waste is burned in an incinerator.

Combustion Product: Substance produced during the burning or oxidation of a material.

Command Post: Facility located at a safe distance upwind from an accident site, where the on-scene coordinator, responders, and technical representatives make response decisions, deploy manpower and equipment, maintain liaison with news media, and handle communications.

Comment Period: Time provided for the public to review and comment on a proposed EPA action or rulemaking after publication in the Federal Register.

Commercial Waste Management Facility: A treatment, storage, disposal, or transfer facility which accepts waste from a variety of sources, as compared to a private facility which normally manages a limited waste stream generated by its own operations.

Commercial Waste: All solid waste emanating from business establishments such as stores, markets, office buildings, restaurants, shopping centers, and theaters.

Commingle Recyclables: Mixed recyclables that are collected together.

Comminuter: A machine that shreds or pulverizes solids to make waste treatment easier.

Comminution: Mechanical shredding or pulverizing of waste. Used in both solid waste management and wastewater treatment.

Community: In ecology, a group of interacting populations in time and space. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest.

Community Relations: The EPA effort to establish two-way communication with the public to create understanding of EPA programs and related actions, to assure public input into decision-making processes related to affected communities, and to make certain that the Agency is aware of and responsive to public concerns. Specific community relations activities are required in relation to Superfund remedial actions.

Community Water System: A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents.

Compaction: Reduction of the bulk of solid waste by rolling and tamping.

Compliance Coating: A coating whose volatile organic compound content does not exceed that allowed by regulation.

Compliance Monitoring: Collection and evaluation of data, including self-monitoring reports, and verification to show whether pollutant concentrations and loads contained in permitted discharges are in compliance with the limits and conditions specified in the permit.

Compliance Schedule: A negotiated agreement between a pollution source and a government agency that specifies dates and procedures by which a source will reduce emissions and, thereby, comply with a regulation.

Composite Sample: A series of water samples taken over a given period of time and weighted by flow rate.

Compost: The relatively stable humus material that is produced from a composting process in which bacteria in soil mixed with garbage and degradable trash break down the mixture into organic fertilizer.

Composting: The controlled biological decomposition of organic material in the presence of air to form a humus-like material. Controlled methods of composting include mechanical mixing and aerating, ventilating the materials by dropping them through a vertical series of aerated chambers, or placing the compost in piles out in the open air and mixing it or turning it periodically.

Conditional Registration: Under special circumstances, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) permits registration of pesticide products that is "conditional" upon the submission of additional data. These special circumstances include a finding by the EPA Administrator that a new product or use of an existing pesticide will not significantly increase the risk of unreasonable adverse effects. A product containing a new (previously unregistered) active ingredient may be conditionally registered only if the Administrator finds that such conditional registration is in the public interest, that a reasonable time for conducting the additional studies has not elapsed, and the use of the pesticide for the period of conditional registration will not present an unreasonable risk.

Conditionally Exempt Generators (CE): Persons or enterprises which produce less than 220 pounds of hazardous waste per month. Exempt from most regulation, they are required merely to determine whether their waste is hazardous, notify appropriate state or local agencies, and ship it by permitted facility for proper disposal. (See: an authorized transporter to a small quantity generator.)

Cone of Depression: A depression in the water table that develops around a pumped well.

Confined Aquifer: An aquifer in which ground water is confined under pressure which is significantly greater than atmospheric pressure.

Consent Decree: A legal document, approved by a judge, that formalizes an agreement reached between EPA and potentially responsible parties (PRPs) through which PRPs will conduct all or part of a cleanup action at a Superfund site; cease or correct actions or processes that are polluting the environment; or otherwise comply with EPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. The consent decree describes the actions PRPs will take and may be subject to a public comment period.

Conservation: Preserving and renewing, when possible, human and natural resources. The use, protection, and improvement of natural resources according to principles that will assure their highest economic or social benefits.

Construction and Demolition Waste: Waste building materials, dredging materials, tree stumps, and rubble resulting from construction, remodeling, repair, and demolition of homes, commercial buildings and other structures and pavements. May contain lead, asbestos, or other hazardous substances.

Contact Pesticide: A chemical that kills pests when it touches them, instead of by ingestion. Also, soil that contains the minute skeletons of certain algae that scratch and dehydrate waxy-coated insects.

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contingency Plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous waste, or radioactive materials that threaten human health or the environment. (See: National Oil and Hazardous Substances Contingency Plan.)

Continuous Discharge: A routine release to the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc.

Contour Plowing: Soil tilling method that follows the shape of the land to discourage erosion.

Contract Labs: Laboratories under contract to EPA, which analyze samples taken from waste, soil, air, and water or carry out research projects.

Control Technique Guidelines (CTG): A series of EPA documents designed to assist states in defining reasonable available control technology (RACT) for major sources of volatile organic compounds (VOC).

Controlled Reaction: A chemical reaction under temperature and pressure conditions maintained within safe limits to produce a desired product or process.

Conventional Pollutants: Statutorily listed pollutants understood well by scientists. These may be in the form of organic waste, sediment, acid, bacteria, viruses, nutrients, oil and grease, or heat.

Conventional Systems: Systems that have been traditionally used to collect municipal wastewater in gravity sewers and convey it to a central primary or secondary treatment plant prior to discharge to surface waters.

Conventional Tilling: Tillage operations considered standard for a specific location and crop and that tend to bury the crop residues; usually considered as a base for determining the cost effectiveness of control practices.

Cooling Electricity Use: Amount of electricity used to meet the building cooling load. (See: building cooling load.)

Cooling Tower: A structure that helps remove heat from water used as a coolant; e.g., in electric power generating plants.

Cooperative Agreement: An assistance agreement whereby EPA transfers money, property, services or anything of value to a state for the accomplishment of CERCLA-authorized activities or tasks.

Core: The uranium-containing heart of a nuclear reactor, where energy is released.

Core Program Cooperative Agreement: An assistance agreement whereby EPA supports states or tribal governments with funds to help defray the cost of non-item-specific administrative and training activities.

Corrosion: The dissolution and wearing away of metal caused by a chemical reaction such as between water and the pipes, chemicals touching a metal surface, or contact between two metals.

Corrosive: A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away.

Cost-Effective Alternative: An alternative control or corrective method identified after analysis as being the best available in terms of reliability, performance, and cost. Although costs are one important consideration, regulatory and compliance analysis does not require EPA to choose the least expensive alternative. For example, when selecting a method for cleaning up a site on the Superfund National Priorities List, the Agency balances costs with the long-term effectiveness of the methods proposed.

Cost Recovery: A legal process by which potentially responsible parties who contributed to contamination at a Superfund site can be required to reimburse the Trust Fund for money spent during any cleanup actions by the federal government.

Cover Material: Soil used to cover compacted solid waste in a sanitary landfill.

Cover: Vegetation or other material providing protection as ground cover.

Cradle-to-Grave or Manifest System: A procedure in which hazardous materials are identified and followed as they are produced, treated, transported, and disposed of by a series of permanent, linkable, descriptive documents (e.g., manifests). Commonly referred to as the cradle-to-grave system.

Criteria Pollutants: The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Criteria: Descriptive factors taken into account by EPA in setting standards for various pollutants. These factors are used to determine limits on allowable concentration levels, and to limit the number of violations per year. When issued by EPA, the criteria provide guidance to the states on how to establish their standards.

Crop Consumptive Use: The amount of water transpired during plant growth plus what evaporated from the soil surface and foliage in the crop area.

Cubic Feet Per Minute (CFM): A measure of the volume of a substance flowing through air within a fixed period of time. With regard to indoor air, refers to the amount of air, in cubic feet, that is exchanged with indoor air in a minute's time, i.e., the air exchange rate.

Cullet: Crushed glass.

Cultural Eutrophication: Increasing rate at which water bodies "die" by pollution from human activities.

Cultures and Stocks: Infectious agents and associated biologicals including: cultures from medical and pathological laboratories; cultures and stocks of infectious agents from research and industrial laboratories; waste from the production of biologicals; discarded live and attenuated vaccines; and culture dishes and devices used to transfer, inoculate, and mix cultures. (See: regulated medical waste.)

Cumulative Working Level Months (CWLm): The sum of lifetime exposure to radon working levels expressed in total working level months.

Curbside Collection: Method of collecting recyclable materials at homes, community districts or businesses.

Cutie-Pie: An instrument used to measure radiation levels.

Cyclone Collector: A device that uses centrifugal force to pull large particles from polluted air.

D

Data Call-In: A part of the Office of Pesticide Programs (OPP) process of developing key required test data, especially on the long-term, chronic effects of existing pesticides, in advance of scheduled Registration Standard reviews. Data Call-In from manufacturers is an adjunct of the Registration Standards program intended to expedite re-registration.

DDT: The first chlorinated hydrocarbon insecticide chemical name: Dichloro-Diphenyl-Trichloroethane. It has a half-life of 15 years and can collect in fatty tissues of certain animals. EPA banned registration and interstate sale of DDT for virtually all but emergency uses in the United States in 1972 because of its persistence in the environment and accumulation in the food chain.

Decay Products: Degraded radioactive materials, often referred to as "daughters" or "progeny"; radon decay products of most concern from a public health standpoint are polonium-214 and polonium-218.

Dechlorination: Removal of chlorine from a substance by chemically replacing it with hydrogen or hydroxide ions in order to detoxify a substances.

Decomposition: The breakdown of matter by bacteria and fungi, changing the chemical makeup and physical appearance of materials.

Decontamination: Removal of harmful substances such as noxious chemicals, harmful bacteria or other organisms, or radioactive material from exposed individuals, rooms and furnishings in buildings, or the exterior environment.

Deep-Well Injection: Deposition of raw or treated, filtered hazardous waste by pumping it into deep wells, where it is contained in the pores of permeable subsurface rock.

Deflocculating Agent: A material added to a suspension to prevent settling.

Defoliant: An herbicide that removes leaves from trees and growing plants.

Delegated State: A state (or other governmental entity such as a tribal government) that has received authority to administer an environmental regulatory program in lieu of a federal counterpart. As used in connection with NPDES, UIC, and PWS programs, the term does not connote any transfer of federal authority to a state.

Delist: Use of the petition process to have a facility's toxic designation rescinded.

Demand-side Waste Management: Prices whereby consumers use purchasing decisions to communicate to product manufacturers that they prefer environmentally sound products packaged with the least amount of waste, made from recycled or recyclable materials, and containing no hazardous substances.

Denitrification: The anaerobic biological reduction of nitrate to nitrogen gas.

Depletion Curve: In hydraulics, a graphical representation of water depletion from storage-stream channels, surface soil, and groundwater. A depletion curve can be drawn for base flow, direct runoff, or total flow.

Depressurization: A condition that occurs when the air pressure inside a structure is lower than the air pressure outside. Depressurization can occur when household appliances such as fireplaces or furnaces, that consume or exhaust house air, are not supplied with enough makeup air. Radon may be drawn into a house more rapidly under depressurized conditions.

Dermal Toxicity: The ability of a pesticide or toxic chemical to poison people or animals by contact with the skin. (See: contact pesticide.)

DES: A synthetic estrogen, diethylstilbestrol is used as a growth stimulant in food animals. Residues in meat are thought to be carcinogenic.

Desalination: [Desalinization] (1) Removing salts from ocean or brackish water by using various technologies. (2) Removal of salts from soil by artificial means, usually leaching.

Desiccant: A chemical agent that absorbs moisture; some desiccants are capable of drying out plants or insects, causing death.

Design Capacity: The average daily flow that a treatment plant or other facility is designed to accommodate.

Designated Pollutant: An air pollutant which is neither a criteria nor hazardous pollutant, as described in the Clean Air Act, but for which new source performance standards exist. The Clean Air Act does require states to control these pollutants, which include acid mist, total reduced sulfur (TRS), and fluorides.

Designated Uses: Those water uses identified in state water quality standards that must be achieved and maintained as required under the Clean Water Act. Uses can include cold water fisheries, public water supply, irrigation, etc.

Designer Bugs: Popular term for microbes developed through biotechnology that can degrade specific toxic chemicals at their source in toxic waste dumps or in ground water.

Destination Facility: The facility to which regulated medical waste is shipped for treatment and destruction, incineration, and/or disposal.

Destroyed Medical Waste: Regulated medical waste that has been ruined, torn apart, or mutilated through thermal treatment, melting, shredding, grinding, tearing, or breaking, so that it is no longer generally recognized as medical waste, but has not yet been treated (excludes compacted regulated medical waste.)

Destruction and Removal Efficiency (DRE): A percentage that represents the number of molecules of a compound removed or destroyed in an incinerator relative to the number of molecules entered the system (e.g., a DRE of 99.99 percent means that 9,999 molecules are destroyed for every 10,000 that enter; 99.99 percent is known as "four nines." For some pollutants, the RCRA removal requirement may be as stringent as "six nines.")

Destruction Facility: A facility that destroys regulated medical waste by mashing or mutilating it.

Desulfurization: Removal of sulfur from fossil fuels to reduce pollution.

Detectable Leak Rate: The smallest leak from a storage tank), expressed in terms gallons-or liters-per-hour, that a test can reliably discern with a certain probability of detection or false alarm.

Detection Criterion: A predetermined rule to ascertain whether a tank is leaking or not. Most volumetric tests use a threshold value as the detection criterion. (See: volumetric tank tests.)

Detergent: Synthetic washing agent that helps to remove dirt and oil. Some contain compounds which kill useful bacteria and encourage algae growth when they are in wastewater that reaches receiving waters.

Development Effects: Adverse effects such as altered growth, structural abnormality, functional deficiency, or death observed in a developing organism.

Diatomaceous Earth (Diatomite): A chalk-like material (fossilized diatoms) used to filter out solid waste in wastewater treatment plants, also used as an active ingredient in some powdered pesticides.

Diazinon: An insecticide. In 1986, EPA banned its use on open areas such as sod farms and golf courses because it posed a danger to migratory birds. The ban did not apply to agricultural, home lawn or commercial establishment uses.

Dibenzofurans: A group of highly toxic organic compounds.

Dicofol: A pesticide used on citrus fruits.

Diffused Air: A type of aeration that forces oxygen into sewage by pumping air through perforated pipes inside a holding tank.

Digester: In wastewater treatment, a closed tank; in solid-waste conversion, a unit in which bacterial action is induced and accelerated in order to break down organic matter and establish the proper carbon to nitrogen ratio.

Digestion: The biochemical decomposition of organic matter, resulting in partial gasification, liquefaction, and mineralization of pollutants.

Dike: A low wall that can act as a barrier to prevent a spill from spreading.

Diluent: Any liquid or solid material used to dilute or carry an active ingredient.

Dilution Ratio: The relationship between the volume of water in a stream and the volume of incoming water. It affects the ability of the stream to assimilate waste.

Dinocap: A fungicide used primarily by apple growers to control summer diseases. EPA proposed restrictions on its use in 1986 when laboratory tests found it caused birth defects in rabbits.

Dinoseb: A herbicide that is also used as a fungicide and insecticide. It was banned by EPA in 1986 because it posed the risk of birth defects and sterility.

Dioxin: Any of a family of compounds known chemically as dibenzo-p-dioxins. Concern about them arises from their potential toxicity and contaminants in commercial products. Tests on laboratory animals indicate that it is one of the more toxic man-made compounds.

Direct Discharger: A municipal or industrial facility which introduces pollution through a defined conveyance or system such as outlet pipes; a point source.

Disinfectant: A chemical or physical process that kills pathogenic organisms in water. Chlorine is often used to disinfect sewage treatment effluent, water supplies, wells, and swimming pools.

Dispersant: A chemical agent used to break up concentrations of organic material such as spilled oil.

Disposables: Consumer products, other items, and packaging used once or a few times and discarded.

Disposal: Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials from removal actions or accidental releases. Disposal may be accomplished through use of approved secure landfills, surface impoundments, land farming, deep-well injection, ocean dumping, or incineration.

Dissolved Oxygen (DO): The oxygen freely available in water, vital to fish and other aquatic life and for the prevention of odors. DO levels are considered a most important indicator of a water body's ability to support desirable aquatic life. Secondary and advanced waste treatment are generally designed to ensure adequate DO in waste-receiving waters.

Dissolved Solids: Disintegrated organic and inorganic material in water. Excessive amounts make water unfit to drink or use in industrial processes.

Distillation: The act of purifying liquids through boiling, so that the steam condenses to a pure liquid and the pollutants remain in a concentrated residue.

Diversion: A channel with a supporting ridge on the lower side constructed across a slope to divert water at a non-erosive velocity to sites where it can be used or disposed of through a stable outlet.

Diversion Rate: The percentage of waste materials diverted from traditional disposal such as landfilling or incineration to be recycled, composted, or re-used.

DNA Hybridization: Use of a segment of DNA, called a DNA probe, to identify its complementary DNA; used to detect specific genes.

Dose Response: How a biological organism's response to a toxic substance quantitatively shifts as its overall exposure to the substance changes (e.g., a small dose of carbon monoxide may cause drowsiness; a large dose can be fatal.)

DOT Reportable Quantity: The quantity of a substance specified in U.S. Department of Transportation regulation that triggers labelling, packaging and other requirements related to shipping such substances.

Draft Permit: A preliminary permit drafted and published by EPA; subject to public review and comment before final action on the application.

Dredging: Removal of mud from the bottom of water bodies. This can disturb the ecosystem and causes silting that kills aquatic life. Dredging of contaminated muds can expose biota to heavy metals and other toxics. Dredging activities may be subject to regulation under Section 404 of the Clean Water Act.

Drop-off: Recyclable materials collection method in which individuals bring them to a designated collection site.

Dump: A site used to dispose of solid waste without environmental controls.

Dustfall Jar: An open container used to collect large particles from the air for measurement and analysis.

Dystrophic Lakes: Acidic, shallow bodies of water that contain much humus and/or other organic matter; contain many plants but few fish.

E

Ecological Impact: The effect that a man-made or natural activity has on living organisms and their non-living (abiotic) environment.

Ecology: The relationship of living things to one another and their environment, or the study of such relationships.

Ecological Indicator: A characteristic of the environment that, when measured, quantifies magnitude of stress, habitat characteristics, degree of exposure to a stressor, or ecological response to exposure. The term is a collective term for response, exposure. The term is a collective term for response, exposure, habitat, and stressor indicators.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial hazard identification, exposure and dose-response assessments, and risk characterization.

Economic Poisons: Chemicals used to control pests and to defoliate cash crops such as cotton.

Ecosphere: The "bio-bubble" that contains life on earth, in surface waters, and in the air. (See: biosphere.)

Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

Ecosystem Structure: Attributes related to instantaneous physical state of an ecosystem; examples include species population density, species richness or evenness, and standing crop biomass.

Ecosystem: A habitat created by the juxtaposition of distinctly different habitats; an edge habitat; or an ecological zone or boundary where two or more ecosystems meet.

Effluent: Wastewater-treated or untreated that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Effluent Guidelines: Technical EPA documents which set effluent limitations for given industries and pollutants.

Effluent Limitation: Restrictions established by a State or EPA on quantities, rates, and concentrations in wastewater discharges.

Effluent Standard: (See effluent limitation.)

Electrodialysis: A process that uses electrical current applied to permeable membranes to remove minerals from water. Often used to desalinize salty or brackish water.

Electrostatic Precipitator (ESP): A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Eligible Costs: The construction costs for waste-water treatment works upon which EPA grants are based.

EMAP Data: Environmental monitoring data collected under the auspices of the Environmental Monitoring and Assessment Program. All EMAP data share the common attribute of being of known quality, having been collected in the context of explicit data quality objectives (DQOs) and a consistent quality assurance program.

Emergency (Chemical): A situation created by an accidental release or spill of hazardous chemicals that poses a threat to the safety of workers, residents, the environment, or property.

Emergency Episode: (See: air pollution episode.)

Emergency Response Values: Concentrations of chemicals, published by various groups, defining acceptable levels for short-term exposures in emergencies.

Emission: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities; from residential chimneys; and from motor vehicle, locomotive, or aircraft exhausts.

Emission Factor: The relationship between the amount of pollution produced and the amount of raw material processed. For example, an emission factor for a blast furnace making iron would be the number of pounds of particulates per ton of raw materials.

Emission Inventory: A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community; used to establish emission standards.

Emission Standard: The maximum amount of air polluting discharge legally allowed from a single source, mobile or stationary.

Emissions Trading: EPA policy that allows a plant complex with several facilities to decrease pollution from some facilities while increasing it from others, so long as total results are equal to or better than previous limits. Facilities where this is done are treated as if they exist in a bubble in which total emissions are averaged out. Complexes that reduce emissions substantially may "bank" their "credits" or sell them to other industries. **Encapsulation:** The treatment of asbestos-containing material with a liquid that covers the surface with a protective coating or embeds fibers in an adhesive matrix to prevent their release into the air.

Enclosure: Putting an airtight, impermeable, permanent barrier around asbestos-containing materials to prevent the release of asbestos fibers into the air.

Endangered Species: Animals, birds, fish, plants, or other living organisms threatened with extinction by man-made or natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Endangerment Assessment: A study to determine the nature and extent of contamination at a site on the National Priorities List and the risks posed to public health or the environment. EPA or the state conduct the study when a legal action is to be taken to direct potentially responsible parties to clean up a site or pay for it. An endangerment assessment supplements a remedial investigation.

Energy Recovery: Obtaining energy from waste through a variety of processes (e.g., combustion.)

Enforceable Requirements: Conditions or limitations in permits issued under the Clean Water Act, Section 402 or 404 that, if violated, could result in the issuance of a compliance order or initiation of a civil or criminal action under federal or applicable state laws. If a permit has not been issued, the term includes any requirement which, in the Regional Administrator's judgement, would be included in the permit when issued. Where no permit applies, the term includes any requirement which the RA determines is necessary for the best practical waste treatment technology to meet applicable criteria.

Enforcement: EPA, state, or local legal actions to obtain compliance with environmental laws, rules, regulations, or agreements and/or obtain penalties or criminal sanctions for violations. Enforcement procedures may vary, depending on the requirements of different environmental laws and related implementing regulations. Under CERCLA, for example, EPA will seek to require potentially responsible parties to clean up a Superfund site, or pay for the cleanup, whereas under the Clean Air Act the agency may invoke sanctions against cities failing to meet ambient air quality standards that could prevent certain types of construction or federal funding. In other situations, if investigations by EPA and state agencies uncover willful violations, criminal trials and penalties are sought.

Enforcement Decision Document (EDD): A document that provides an explanation to the public of EPA's selection of the cleanup alternative at enforcement sites on the National Priorities List. Similar to a Record of Decision.

Enhanced Inspection and Maintenance (I&M): An improved automobile inspection and maintenance program—aimed at reducing automobile emissions—that contains, at a minimum, more vehicle types and model years, tighter inspection, and better management practices. It may also include annual computerized or centralized inspections, under-the-hood inspection for signs of tampering with pollution control equipment, and increased repair waiver cost.

Enrichment: The addition of nutrients (e.g., nitrogen, phosphorus, carbon compounds) from sewage effluent or agricultural runoff to surface water, greatly increases the growth potential for algae and other aquatic plants.

Environment: The sum of all external conditions affecting the life, development and survival of an organism.

Environmental Assessment: An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental Audit: An independent assessment of the current status of a party's compliance with applicable environmental requirements or of a party's environmental compliance policies, practices, and controls.

Environmental Impact Statement: A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

Environmental Indicator: A measurement, statistic or value that provides a proximate gauge or evidence of the effects of environmental management programs or of the state or condition of the environment.

Environmental Response Team: EPA experts located in Edison, N.J., and Cincinnati, OH, who can provide around-the-clock technical assistance to EPA regional offices and states during all types of hazardous waste site emergencies and spills of hazardous substances.

Epidemiology: Study of the distribution of disease, or other health-related states and events in human populations, as related to age, sex, occupation, ethnic, and economic status in order to identify and alleviate health problems and promote better health.

Epilimnion: Upper waters of a thermally stratified lake subject to wind action.

Episode (Pollution): An air pollution incident in a given area caused by a concentration of atmospheric pollutants under meteorological conditions that may result in a significant increase in illnesses or deaths. May also describe water pollution events or hazardous material spills.

Equilibrium: In relation to radiation, the state at which the radioactivity of consecutive elements within a radioactive series is neither increasing nor decreasing.

Equivalent Method: Any method of sampling and analyzing for air pollution which has been demonstrated to the EPA Administrator's satisfaction to be, under specific conditions, an acceptable alternative to normally used reference methods.

Erosion: The wearing away of land surface by wind or water, intensified by land-clearing practices related to farming, residential or industrial development, road building, or logging.

Estuary: Regions of interaction between rivers and near-shore ocean waters, where tidal action and river flow mix fresh and salt water. Such areas include bays, mouths of rivers, salt marshes, and lagoons. These brackish water ecosystems shelter and feed marine life, birds, and wildlife. (See: wetlands.)

Ethylene Dibromide (EDB): A chemical used as an agricultural fumigant and in certain industrial processes. Extremely toxic and found to be a carcinogen in laboratory animals, EDB has been banned for most agricultural uses in the United States.

Eutrophie Lakes: ~~Shallow, murky bodies of water with concentrations of plant nutrients causing excessive production of algae. (See: dystrophic lakes.)~~

Eutrophication: The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the water body is choked by abundant plant life due to higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

Evaporation Ponds: Areas where sewage sludge is dumped and dried.

Evapotranspiration: The loss of water from the soil both by evaporation and by transpiration from the plants growing in the soil.

Exceedance: Violation of the pollutant levels permitted by environmental protection standards.

Exclusion: In the asbestos program, one of several situations that permit a Local Education Agency (LEA) to delete one or more of the items required by the Asbestos Hazard Emergency Response Act (AHERA), e.g., records of previous asbestos sample collection and analysis may be used by the accredited inspector in lieu of AHERA bulk sampling.

Exclusionary Ordinance: Zoning that excludes classes of persons or businesses from a particular neighborhood or area.

Exempt Solvent: Specific organic compounds not subject to requirements of regulation because are deemed by EPA to be of negligible photochemical reactivity.

Exempted Aquifer: Underground bodies of water defined in the Underground Injection Control program as aquifers that are potential sources of drinking water though not being used as such, and thus exempted from regulations barring underground injection activities.

Exotic Species: A species that is not indigenous to a region.

Experimental Use Permit: Obtained by manufacturers for testing new pesticides or uses of thereof whenever they conduct experimental field studies to support registration on 10 acres or more on land or one acre or more of water.

Explosive Limits: The amounts of vapor in the air that form explosive mixtures; limits are expressed as lower and upper limits and give the range of vapor concentrations in air that will explode if an ignition source is present.

Exposure: The amount of radiation or pollutant present in a given environment that represents a potential health threat to living organisms.

Exposure Indicator: A characteristic of the environment measured to provide evidence of the occurrence or magnitude of a response indicator's exposure to a chemical or biological stress.

Extraction Procedure (E P Toxic): Determining toxicity by a procedure which simulates leaching; if a certain concentration of a toxic substance can be leached from a waste, that waste is considered hazardous, i.e., "E P Toxic."

Extremely Hazardous Substances: Any of 406 chemicals identified by EPA as toxic, and listed under SARA Title III. The list is subject to periodic revision.

F

Fabric Filter: A cloth device that catches dust particles from industrial emissions.

Facilities Plans: Plans and studies related to the construction of treatment works necessary to comply with the Clean Water Act or RCRA. A facilities plan investigates needs and provides information on the cost effectiveness of alternatives, a recommended plan, an environmental assessment of the recommendations, and descriptions of the treatment works, costs, and a completion schedule.

Facility Emergency Coordinator: Representative of a facility covered by environmental law (e.g. a chemical plant) who participates in the emergency reporting process with the Local Emergency Planning Committee (LEPC).

Feasibility Study: 1. Analysis of the practicability of a proposal; e.g., a description and analysis of potential cleanup alternatives for a site such as one on the National Priorities List. The feasibility study usually recommends selection of a cost-effective alternative. It usually starts as soon as the remedial investigation is underway; together, they are commonly referred to as the "RI/FS". 2. A small-scale investigation of a problem to ascertain whether a proposed research approach is likely to provide useful data.

Fecal Coliform Bacteria: Bacteria found in the intestinal tracts of mammals. Their presence in water or sludge is an indicator of pollution and possible contamination by pathogens.

Federal Implementation Plan: Under current law, a federally implemented plan to achieve attainment of air quality standards, used when a state is unable to develop an adequate plan.

Feedlot: A confined area for the controlled feeding of animals. Tends to concentrate large amounts of animal waste that cannot be absorbed by the soil and, hence, may be carried to nearby streams or lakes by rainfall runoff.

Fen: A type of wetland that accumulates peat deposits. Fens are less acidic than bogs, deriving most of their water from groundwater rich in calcium and magnesium. (See: wetlands.)

FIFRA Pesticide Ingredient: An ingredient of a pesticide that must be registered with EPA under the Federal Insecticide, fungicide, and Rodenticide Act. Products making pesticide claims must register under FIFRA and may be subject to labeling and use requirements.

Filling: Depositing dirt, mud or other materials into aquatic areas to create more dry land, usually for agricultural or commercial development purposes, often with ruinous ecological consequences.

Filter Strip: Strip or area of vegetation used for removing sediment, organic matter, and other pollutants from runoff and waste water.

Filtration: A treatment process, under the control of qualified operators, for removing solid (particulate) matter from water by means of porous media such as sand or a man-made filter; often used to remove particles that containing pathogens.

Financial Assurance for Closure: Documentation or proof that an owner or operator of a facility such as a landfill or other waste repository is capable of paying the projected costs of closing the facility and monitoring it afterwards as provided in RCRA regulations.

Finding of No Significant Impact: A document prepared by a federal agency showing why a proposed action would not have a significant impact on the environment and thus would not require preparation of an Environmental Impact Statement. An FNSI is based on the results of an environmental assessment.

First Draw: The water that comes out when a tap is first opened, likely to have the highest level of lead contamination from plumbing materials.

Flare: A control device that burns hazardous materials to prevent their release into the environment; may operate continuously or intermittently, usually on top a stack.

Floc: A clump of solids formed in sewage by biological or chemical action.

Flocculation: Process by which clumps of solids in water or sewage aggregate through biological or chemical action so they can be separated from water or sewage.

Floor Sweep: Capture of heavier-than-air gases that collect at floor level.

Flow Rate: The rate, expressed in gallons or liters-per-hour, at which a fluid escapes from a hole or fissure in a tank. Such measurements are also made of liquid waste, effluent, and surface water movement.

Flowmeter: A gauge indicating the velocity of wastewater moving through a treatment plant or of any liquid moving through various industrial processes.

Flue Gas Desulfurization: A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the art technology for major SO₂ emitters, like power plants.

Flue Gas: The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Fluidized Bed Incinerator: An incinerator that uses a bed of hot sand or other granular material to transfer heat directly to waste. Used mainly for destroying municipal sludge.

Flume: A natural or man-made channel that diverts water.

Fluorides: Gaseous, solid, or dissolved compounds containing fluorine that result from industrial processes. Excessive amounts in food can lead to fluorosis.

Fluorocarbons (FCs): Any of a number of organic compounds analogous to hydrocarbons in which one or more hydrogen atoms are replaced by fluorine. Once used in the United States as a propellant for domestic aerosols, they are now found mainly in coolants and some industrial processes. FCs containing chlorine are called chlorofluorocarbons (CFCs). They are believed to be modifying the ozone layer in the stratosphere, thereby allowing more harmful solar radiation to reach the Earth's surface.

Flush: 1. To open a cold-water tap to clear out all the water which may have been sitting for a long time in the pipes. In new homes, to flush a system means to send large volumes of water gushing through the unused pipes to remove loose particles of solder and flux. 2. To force large amounts of water through liquid to clean out piping or tubing, storage or process tanks.

Fly Ash: Non-combustible residual particles expelled by flue gas.

Fogging: Applying a pesticide by rapidly heating the liquid chemical so that it forms very fine droplets that resemble smoke or fog. Used to destroy mosquitoes, black flies, and similar pests.

Food Chain: A sequence of organisms, each of which uses the next, lower member of the sequence as a food source.

Formaldehyde: A colorless, pungent, and irritating gas, CH₂O, used chiefly as a disinfectant and preservative and in synthesizing other compounds like resins.

Formulation: The substances comprising all active and inert ingredients in a pesticide.

Fresh Water: Water that generally contains less than 1,000 milligrams-per-liter of dissolved solids.

Friable Asbestos: Any material containing more than one percent asbestos, and that can be crumbled or reduced to powder by hand pressure. (May include previously non-friable material which becomes broken or damaged by mechanical force.)

Friable: Capable of being crumbled, pulverized, or reduced to powder by hand pressure.

Fuel Economy Standard: The Corporate Average Fuel Economy Standard (CAFE) effective in 1978. It enhanced the national fuel conservation effort imposing a miles-per-gallon floor for motor vehicles.

Fugitive Emissions: Emissions not caught by a capture system.

Fume: Tiny particles trapped in vapor in a gas stream.

Fumigant: A pesticide vaporized to kill pests. Used in buildings and greenhouses.

Functional Equivalent: Term used to describe EPA's decision-making process and its relationship to the environmental review conducted under the National Environmental Policy Act (NEPA). A review is considered functionally equivalent when it addresses the substantive components of a NEPA review.

Fungi: (Singular: Fungus) Molds, mildews, yeasts, mushrooms, and puffballs, a group of organisms lacking in chlorophyll (i.e., are not photosynthetic) and which are usually non-mobile, filamentous, and multicellular. Some grow in soil, others attach themselves to decaying trees and other plants whence they obtain nutrients. Some are pathogens, others stabilize sewage and digest composted waste.

Fungicide: Pesticides which are used to control, deter, or destroy fungi.

Fungistat: A chemical that keeps fungi from growing.

Furrow Irrigation: Irrigation method in which water travels through the field by means of small channels between each row or groups of rows.

Future Liability: Refers to potentially responsible parties' obligations to pay for additional response activities beyond those specified in the Record of Decision or Consent Decree.

G

Game Fish: Species like trout, salmon, or bass, caught for sport. Many of them show more sensitivity to environmental change than "rough" fish.

Garbage: Animal and vegetable waste resulting from the handling, storage, sale, preparation, cooking, and serving of foods.

Gas Chromatography/Mass Spectrometer: Highly sophisticated instrument that identifies the molecular composition and concentrations of various chemicals in water and soil samples.

Gasification: Conversion of solid material such as coal into a gas for use as a fuel.

Gasoline Volatility: The property of gasoline whereby it evaporates into a vapor. Gasoline vapor is a volatile organic compound.

General Permit: A permit applicable to a class or category of dischargers.

General Reporting Facility: A facility having one or more hazardous chemicals above the 10,000 pound threshold for planning quantities. Such facilities must file MSDS and emergency inventory information with the SERC and LEPC and local fire departments.

Generator: 1. A facility or mobile source that emits pollutants into the air or releases hazardous waste into water or soil. 2. Any person, by site, whose act or process produces regulated medical waste or whose act first causes such waste to become subject to regulation. In a case where more than one person (e.g., doctors with separate medical practices) is located in the same building, each business entity is a separate generator.

Genetic Engineering: A process of inserting new genetic information into existing cells in order to modify any organism for the purpose of changing one of its characteristics.

Geographic Information System (GIS): A computer system designed for storing, manipulating, analyzing, and displaying data in a geographic context.

Germicide: Any compound that kills disease-causing microorganisms.

Glovebag: A polyethylene or polyvinyl chloride bag-like enclosure affixed around an asbestos-containing source (most often thermal system insulation) permitting the material to be removed while minimizing release of airborne fibers in the surrounding atmosphere.

Grain Loading: The rate at which particles are emitted from a pollution source. Measurement is made by the number of grains per cubic foot of gas emitted.

Granular Activated Carbon Treatment: A filtering system often used in small water systems and individual homes to remove organics. GAC can be highly effective in removing elevated levels of radon from water.

Grassed Waterway: Natural or constructed watercourse or outlet that is shaped or graded and established in suitable vegetation for the disposal of runoff water without erosion.

Gray Water: Domestic wastewater composed of wash water from kitchen, bathroom, and laundry sinks, tubs, and washers.

Greenhouse Effect: The warming of the Earth's atmosphere attributed to a build-up of carbon dioxide or other gases; some scientists think that this build-up allows the sun's rays to heat the Earth, while infrared radiation makes the atmosphere opaque to a counterbalancing loss of heat.

Grinder Pump: A mechanical device that shreds solids and raises sewage to a higher elevation through pressure sewers.

Ground Cover: Plants grown to keep soil from eroding.

Ground Water: The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs. Because ground water is a major source of drinking water, there is growing concern over contamination from leaching agricultural or industrial pollutants or leaking underground storage tanks.

Ground-Water Discharge: Ground water entering near coastal waters which has been contaminated by landfill leachate, deep well injection of hazardous wastes, septic tanks, etc.

Gully Erosion: Severe erosion in which trenches are cut to a depth greater than 30 centimeters (a foot). Generally, ditches deep enough to cross with farm equipment are considered gullies.

H

Habitat: The place where a population (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Habitat Indicator: A physical attribute of the environment measured to characterize conditions necessary to support an organism, population, or community in the absence of pollutants, e.g., salinity of estuarine waters or substrate type in streams or lakes.

Half-Life: 1. The time required for a pollutant to lose half its affect on the environment. For example, the biochemical half-life of DDT in the environment is 15 years of Radium. 1,580 years. 2. The time required for half of the atoms of a radioactive element to undergo self-transmutation or decay. 3. The time required for the elimination of one half a total dose from the body.

Halon: Bromine-containing compounds with long atmospheric lifetimes whose breakdown in the stratosphere causes depletion of ozone. Halons are used in fire-fighting.

Hammermill: A high-speed machine that uses hammers and cutters to crush, grind, chip, or shred solid waste.

Hard Water: Alkaline water containing dissolved salts that interfere with some industrial processes and prevent soap from sudsing.

Hauler: Garbage collection company that offers complete refuse removal service; many also will also collect recyclables.

Hazard Communication Standard: An OSHA regulation that requires chemical manufacturers, suppliers, and importers to assess the hazards of the chemicals that they make, supply, or import, and to inform employers, customers, and workers of these hazards through MSDS sheets.

Hazardous Air Pollutants: Air pollutants which are not covered by ambient air quality standards but which, as defined in the Clean Air Act, may reasonably be expected to cause or contribute to irreversible illness or death. Such pollutants include asbestos, beryllium, mercury, benzene, coke oven emissions, radionuclides, and vinyl chloride.

Hazardous Chemical: An EPA designation for any hazardous material requiring an MSDS under OSHA's Hazard Communication Standard. Such substances are capable of producing fires and explosions or adverse health effects like cancer and dermatitis. Hazardous chemicals are distinct from hazardous waste. (See: Hazardous Waste.)

Hazardous Ranking System: The principle screening tool used by EPA to evaluate risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or ground water, and on other factors such as density and proximity of human population. This score is the primary factor in deciding if the site should be on the National Priorities List and, if so, what ranking it should have compared to other sites on the list.

Hazardous Substance: 1. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. 2. Any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the United States or if otherwise released into the environment.

Hazardous Waste: By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Hazardous Waste Landfill: An excavated or engineered site where hazardous waste is deposited and covered.

Hazards Analysis: Procedures used to (1) identify potential sources of release of hazardous materials from fixed facilities or transportation accidents; (2) determine the vulnerability of a geographical area to a release of hazardous materials; and (3) compare hazards to determine which present greater or lesser risks to a community.

Hazards Identification: Providing information on which facilities have extremely hazardous substances, what those chemicals are, how much there is at each facility, how the chemicals are stored, and whether they are used at high temperatures.

Health Assessment: An evaluation of available data on existing or potential risks to human health posed by a Superfund site. The Agency for Toxic Substances and Disease Registry (ATSDR) of the Department of Health and Human Services (DHHS) is required to perform such an assessment at every site on the National Priorities List.

Heat Island Effect: A "dome" of elevated temperatures over an urban area caused by structural and pavement heat fluxes, and pollutant emissions.

Heavy Metals: Metallic elements with high atomic weights, e.g., mercury, chromium, cadmium, arsenic, and lead; can damage living things at low concentrations and tend to accumulate in the food chain.

Heptachlor: An insecticide that was banned on some food products in 1975 and all of them 1978. It was allowed for use in seed treatment until 1983. More recently it was found in milk and other dairy products in Arkansas and Missouri where dairy cattle were illegally fed treated seed.

Herbicide: A chemical pesticide designed to control or destroy plants, weeds, or grasses.

Herbivore: An animal that feeds on plants.

Heterotrophic Organisms: Species that are dependent on organic matter for food.

High-Density Polyethylene: A material used to make plastic bottles and other products that produces toxic fumes when burned.

High-Level Radioactive Waste (HLW): Waste generated in core fuel of a nuclear reactor, found at nuclear reactors or by nuclear fuel reprocessing; is a serious threat to anyone who comes near the waste without shielding. (See: low-level radioactive waste.)

High-Level Nuclear Waste Facility: Plant designed to handle disposal of used nuclear fuel, high-level radioactive waste, and plutonium waste.

Holding Pond: A pond or reservoir, usually made of earth, built to store polluted runoff.

Homeowner Water System: Any water system which supplies piped water to a single residence.

Homogeneous Area: In accordance with Asbestos Hazard and Emergency Response Act (AHERA) definitions, an area of surfacing materials, thermal surface insulation, or miscellaneous material that is uniform in color and texture.

Hood Capture Efficiency: Ratio of the emissions captured by a hood and directed into a control or disposal device, expressed as a percent of all emissions.

Host: 1. In genetics, the organism, typically a bacterium, into which a gene from another organism is transplanted. 2. In medicine, an animal infected or parasitized by another organism.

Household Waste (Domestic Waste): Solid waste, composed of garbage and rubbish, which normally originated in a private home or apartment house. Domestic waste may contain a significant amount of toxic or hazardous waste.

Hydraulic Gradient: In general, the direction of groundwater flow due to changes in the depth of the water table.

Hydrocarbons (HC): Chemical compounds that consist entirely of carbon and hydrogen.

Hydrogen Sulfide (HS): Gas emitted during organic decomposition. Also a by-product of oil refining and burning. Smells like rotten eggs and, in heavy concentration, can kill or cause illness.

Hydrogeology: The geology of ground water, with particular emphasis on the chemistry and movement of water.

Hydrology: The science dealing with the properties, distribution, and circulation of water.

Hypolimnion: Bottom waters of a thermally stratified lake. The hypolimnion of a eutrophic lake is usually low or lacking in oxygen.

Identification Code or EPA I.D. Number: The unique code assigned to each generator, transporter, and treatment, storage, or disposal facility by regulating agencies to facilitate identification and tracking of chemicals or hazardous waste.

Ignitable: Capable of burning or causing a fire.

Immediately Dangerous to Life and Health (IDLH): The maximum level to which a healthy individual can be exposed to a chemical for 30 minutes and escape without suffering irreversible health effects or impairing symptoms. Used as a "level of concern." (See: level of concern.)

Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

Incident Command Post: A facility located at a safe distance from an emergency site, where the incident commander, key staff, and technical representatives can make decisions and deploy emergency manpower and equipment.

Incident Command System (ICS): The organizational arrangement wherein one person, normally the Fire Chief of the impacted district, is in charge of an integrated, comprehensive emergency response organization and the emergency incident site, backed by an Emergency Operations Center staff with resources, information, and advice.

Incineration: A treatment technology involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Incineration at Sea: Disposal of waste by burning at sea on specially-designed incinerator ships.

Incinerator: A furnace for burning waste under controlled conditions.

Incompatible Waste: A waste unsuitable for mixing with another waste or material because it may react to form a hazard.

Indicator: In biology, an organism, species, or community whose characteristics show the presence of specific environmental conditions, good or bad.

Indirect Discharge: Introduction of pollutants from a non-domestic source into a publicly owned waste-treatment system. Indirect dischargers can be commercial or industrial facilities whose wastes enter local sewers.

Indoor Air: The breathing air inside a habitable structure or conveyance.

Indoor Air Pollution: Chemical, physical, or biological contaminants in indoor air.

Indoor Climate: Temperature, humidity, lighting, and noise levels in a habitable structure or conveyance. Indoor climate can affect indoor air pollution.

Industrial Pollution Prevention: Combination of industrial source reduction and toxic chemical use substitution

Industrial Source Reduction: Practices that reduce the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment; Also reduces the threat to public health and the environment associated with such releases. Term includes equipment or technology modifications, substitution of raw materials, and improvements in housekeeping, maintenance, training or inventory control.

Industrial Waste: Unwanted materials from an industrial operation; may be liquid, sludge, solid, or hazardous waste.

Inert Ingredient: Pesticide components such as solvents, carriers, dispersants, and surfactants that are not active against target pests. Not all inert ingredients are innocuous.

Inertial Separator: A device that uses centrifugal force to separate waste particles.

Infectious Agent: Any organism, such as a virus or bacterium, that is pathogenic and capable of being communicated by invasion and multiplication in body tissues.

Infectious Waste: Hazardous waste with infectious characteristics, including: contaminated animal waste; human blood and blood products; isolation waste, pathological waste; and discarded sharps (needles, scalpels or broken medical instruments.)

Infiltration: 1. The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls. 2. The technique of applying large volumes of waste water to land to penetrate the surface and percolate through the underlying soil. (See: percolation.)

Infiltration Rate: The quantity of water than can enter the soil in a specified time interval.

Inflow: Entry of extraneous rain water into a sewer system from sources other than infiltration, such as basement drains, manholes, storm drains, and street washing.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Information File: In the Superfund program, a file that contains accurate, up-to-date documents on a Superfund site. The file is usually located in a public building (school, library, or city hall) convenient for local residents.

Injection Well: A well into which fluids are injected for purposes such as waste disposal, improving the recovery of crude oil, or solution mining.

Injection Zone: A geological formation receiving fluids through a well.

Innovative Technologies: New or inventive methods to treat effectively hazardous waste and reduce risks to human health and the environment.

Inoculum: 1. Bacterium placed in compost to start biological action. 2. A medium containing organisms that is introduced into cultures or living organisms.

Inorganic Chemicals: Chemical substances of mineral origin, not of basically carbon structure.

Insecticide: A pesticide compound specifically used to kill or prevent the growth of insects.

Inspection and Maintenance (I/M): 1. Activities to assure that vehicles' emissions-controls work properly. 2. Also applies to wastewater treatment plants and other anti-pollution facilities and processes.

Instream Use: Water use taking place within a stream channel, e.g., hydro-electric power generation, navigation, water quality improvement, fish propagation, recreation.

In-Situ Stripping: Treatment system that remove or "strips" volatile organic compounds from contaminated ground or surface water by forcing an airstream through the water and causing the compounds to evaporate.

Integrated Pest Management (IPM): A mixture of chemical and other, non-pesticide, methods to control pests.

Integrated Waste Management: Using a variety of practices to handle municipal solid waste; can include source reduction, recycling, incineration, and landfilling.

Interceptor Sewers: Large sewer lines that, in a combined system, control the flow of sewage to the treatment plant. In a storm, they allow some of the sewage to flow directly into a receiving stream, thus keeping it from overflowing onto the streets. Also used in separate systems to collect the flows from main and trunk sewers and carry them to treatment points.

Interim (Permit) Status: Period during which treatment, storage and disposal facilities coming under RCRA in 1980 are temporarily permitted to operate while awaiting a permanent permit. Permits issued under these circumstances are usually called "Part A" or "Part B" permits.

Interstate Carrier Water Supply: A source of water for drinking and sanitary use on planes, buses, trains, and ships operating in more than one state. These sources are federally regulated.

Interstate Commerce Clause: A clause of the U.S. Constitution which reserves to the federal government the right to regulate the conduct of business across state lines. Under this clause, for example, the U.S. Supreme Court has ruled that states may not inequitably restrict the disposal out-of-state wastes in their jurisdictions.

Interstate Waters: Waters that flow across or form part of state or international boundaries, e.g., the Great Lakes, the Mississippi River, or coastal waters.

Interstitial Monitoring: The continuous surveillance of the space between the walls of an underground storage tank.

Inventory (TSCA): Inventory of chemicals produced pursuant to Section 8 (b) of the Toxic Substances Control Act.

Inversion: A layer of warm air preventing the rise of cooling air and pollutants trapped beneath it. Can cause an air pollution episode.

Ion: An electrically charged atom that can be drawn from waste water during electro-dialysis.

Ion Exchange Treatment: A common water-softening method often found on a large scale at water purification plants that remove some organics and radium by adding calcium oxide or calcium hydroxide to increase the pH to a level where the metals will precipitate out.

Ionization Chamber: A device that measures the intensity of ionizing radiation.

Ionizing Radiation: Radiation that can strip electrons from atoms, i.e., alpha, beta, and gamma radiation.

Irradiated Food: Food subject to brief radioactivity, usually gamma rays, to kill insects, bacteria, and mold, and to permit storage without refrigeration.

Irradiation: Exposure to radiation of wavelengths shorter than those of visible light (gamma, x-ray, or ultraviolet), for medical purposes, to sterilize milk or other food-stuffs, or to induce polymerization of monomers or vulcanization of rubber.

Irrigation: Applying water or wastewater to land areas to supply the water and nutrient needs of plants.

Irrigation Efficiency: The amount of water stored in the crop root zone compared to the amount of irrigation water applied.

Irrigation Return Flow: Surface and sub-surface water which leaves the field following application of irrigation water.

Irritant: A substance that can cause irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high level exposure, or chronic from repeated low-level exposures to such compounds as chlorine, nitrogen dioxide, and nitric acid.

Operating Conditions: Conditions specified in a RCRA permit that dictate how an incinerator must operate as it burns different waste types. A trial burn is used to identify operating conditions needed to meet specified performance standards.

Operation And Maintenance: 1. Activities conducted after a Superfund site action is completed to ensure that the action is effective. 2. Actions taken after construction to assure that facilities constructed to treat waste water will be properly operated and maintained to achieve normative efficiency levels and prescribed effluent limitations in an optimum manner. 3. Ongoing asbestos management plan in a school or other public building, including regular inspections, various methods of maintaining asbestos in place, and removal when necessary.

Oral Toxicity: Ability of a pesticide to cause injury when ingested.

Organic: 1. Referring to or derived from living organisms. 2. In chemistry, any compound containing carbon.

Organic Chemicals/Compounds: Animal or plant-produced substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Organophosphates: Pesticides that contain phosphorus; short-lived, but some can be toxic when first applied.

Organotins: Chemical compounds used in anti-foulant paints to protect the hulls of boats and ships, buoys, and pilings from marine organisms such as barnacles.

Original AHERA Inspection/Original Inspection/Inspection: Examination of school buildings arranged by Local Education Agencies to identify asbestos-containing materials, evaluate their condition, take samples of materials suspected to contain asbestos; performed by EPA-accredited inspectors

Original Generation Point: Where regulated medical or other material first becomes waste.

Outfall: The place where effluent is discharged into receiving waters.

Overburden: Rock and soil cleared away before mining.

Overfire Air: Air forced into the top of an incinerator or boiler to fan the flames.

Overland Flow: A land application technique that cleanses waste water by allowing it to flow over a sloped surface. As the water flows over the surface, contaminants are absorbed and the water is collected at the bottom of the slope for reuse.

Oversized Regulated Medical Waste: Medical waste that is too large for plastic bags or standard containers.

Overtum: One complete cycle of top to bottom mixing of previously stratified water masses. This phenomenon may occur in spring or fall, or after storms, and results in uniformity of chemical and physical properties of water at all depths.

Oxidant: A substance containing oxygen that reacts chemically in air to produce a new substance; the primary ingredient of photochemical smog.

Oxidation: The addition of oxygen that breaks down organic waste or chemicals such as cyanides, phenols, and organic sulfur compounds in sewage by bacterial and chemical means.

Oxidation Pond: A man-made body of water in which waste is consumed by bacteria, used most frequently with other waste-treatment processes; a sewage lagoon.

Oxygenated Fuels: Gasoline which has been blended with alcohols or ethers that contain oxygen in order to reduce carbon monoxide and other emissions.

Oxygenated Solvent: An organic solvent containing oxygen as part of the molecular structure. Alcohols and ketones are oxygenated compounds often used as paint solvents.

Ozone (O₃): Found in two layers of the atmosphere, the stratosphere and the troposphere. In the stratosphere (the atmospheric layer 7 to 10 miles or more above the earth's surface) ozone is a natural form of oxygen that provides a protective layer shielding the earth from ultraviolet radiation. In the troposphere (the layer extending up 7 to 10 miles from the earth's surface), ozone is a chemical oxidant and major component of photochemical smog. It can seriously impair the respiratory system and is one of the most widespread of all the criteria pollutants for which the Clean Air Act required EPA to set standards. Ozone in the troposphere is produced through complex chemical reactions of nitrogen oxides, which are among the primary pollutants emitted by combustion sources; hydrocarbons, released into the atmosphere through the combustion, handling and processing of petroleum products; and sunlight.

Ozonator: A device that adds ozone to water.

Ozone Depletion: Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or-bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.

Ozone Hole: Thinning break in the stratospheric ozone layer. Designation of amount of such depletion as a "ozone hole" is made when detected amount of depletion exceeds fifty percent. Seasonal ozone holes have been observed over both the Antarctic region and the Arctic region and part of Canada and the extreme northeastern United States.

P

Packaging: The assembly of one or more containers and any other components necessary to assure minimum compliance with a program's storage and shipment packaging requirements. Also, the containers, etc., involved.

Packed Bed Scrubber: An air pollution control device in which emissions pass through alkaline water to neutralize hydrogen chloride gas.

Packed Tower: A pollution control device that forces dirty air through a tower packed with crushed rock or wood chips while liquid is sprayed over the packing material. The pollutants in the air stream either dissolve or chemically react with the liquid.

Pandemic: A Widespread throughout an area, nation or the world.

Parameter: A variable, measurable property whose value is a determinant of the characteristics of a system; e.g., temperature, pressure, and density are parameters of the atmosphere.

Paraquat: A standard herbicide used to kill various types of crops, including marijuana.

Part A Permit, Part B Permit: (See: Interim Permit Status.)

Particulate Loading: The mass of particulates per unit volume of air or water.

Participation Rate: Portion of population participating in a recycling program.

Particulates: Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog, found in air or emissions.

Partition Coefficient: Measure of the sorption phenomenon, whereby a pesticide is divided between the soil and water phase; also referred to as adsorption partition coefficient.

Parts Per Billion (ppb)/Parts Per Million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air.

Pathogens: Microorganisms that can cause disease in other organisms or in humans, animals and plants (e.g., bacteria, viruses, or parasites) found in sewage, in runoff from farms or rural areas populated with domestic and wild animals, and in water used for swimming. Fish and shellfish contaminated by pathogens, or the contaminated water itself, can cause serious illness.

Peak Electricity Demand: The maximum electricity used to meet the cooling load of a building or buildings in a given area.

Peak Levels: Levels of airborne pollutant contaminants much higher than average or occurring for short periods of time in response to sudden releases.

Percolation: The movement of water downward and radially through sub-surface soil layers, usually continuing downward to ground water; can also involve upward movement of water.

Performance Data (for incinerators): Information collected, during a trial burn, on concentrations of designated organic compounds and pollutants found in incinerator emissions. Data analysis must show that the incinerator meets performance standards under operating conditions specified in the RCRA permit. (See: trial burn; performance standards.)

Performance Standards: (1) Regulatory requirements limiting the concentrations of designated organic compounds, particulate matter, and hydrogen chloride in emissions from incinerators. (2) Operating standards established by EPA for various permitted pollution control systems, asbestos inspections, and various program operations and maintenance requirements.

Permeability: The rate at which liquids pass through soil or other materials in a specified direction.

Permit: An authorization, license, or equivalent control document issued by EPA or an approved state agency to implement the requirements of an environmental regulation; e.g., a permit to operate a wastewater treatment plant or to operate a facility that may generate harmful emissions.

Persistence: Refers to the length of time a compound stays in the environment, once introduced. A compound may persist for less than a second or indefinitely.

Persistent Pesticides: Pesticides that do not break down chemically or break down very slowly and remain in the environment after a growing season.

Personal Air Samples: Air samples taken with a pump is directly attached to the worker with the collecting filter and cassette placed in the worker's breathing zone (required under OSHA asbestos standards and EPA worker protection rule).

Pest: An insect, rodent, nematode, fungus, weed or other form of terrestrial or aquatic plant or animal life that is injurious to

Pesticide Tolerance: The amount of pesticide residue allowed by law to remain in or on a harvested crop. EPA sets these levels well below the point where the compounds might be harmful to consumers.

Pesticide: Substances or mixture thereof intended for preventing, destroying, repelling, or mitigating any pest. Also, any substance or mixture intended for use as a plant regulator, defoliant, or desiccant.

Phenols: Organic compounds that are byproducts of petroleum refining, tanning, and textile, dye, and resin manufacturing. Low concentrations cause taste and odor problems in water; higher concentrations can kill aquatic life and humans.

Phosphates: Certain chemical compounds containing phosphorus.

Phosphogypsum Piles (stacks): Principal byproduct generated in production of phosphoric acid from phosphate rock. These piles may generate radioactive radon gas.

Phosphorous Plants: Facilities using electric furnaces to produce elemental phosphorous for commercial use, such as high grade phosphoric acid, phosphate-based detergent, and organic chemicals use.

Phosphorus: An essential chemical food element that can contribute to the eutrophication of lakes and other water bodies. Increased phosphorus levels result from discharge of phosphorus-containing materials into surface waters.

Photochemical Oxidants: Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

Photochemical Smog: Air pollution caused by chemical reactions of various pollutants emitted from different sources.

Photosynthesis: The manufacture by plants of carbohydrates and oxygen from carbon dioxide mediated by chlorophyll in the presence of sunlight.

Physical and Chemical Treatment: Processes generally used in large-scale wastewater treatment facilities. Physical processes may include air-stripping or filtration. Chemical treatment includes coagulation, chlorination, or ozonation. The term can also refer to treatment of toxic materials in surface and ground waters, oil spills, and some methods of dealing with hazardous materials on or in the ground.

Phytoplankton: That portion of the plankton community comprised of tiny plants, e.g., algae, diatoms.

Phytotoxic: Harmful to plants.

Picocuries Per Liter pCi/L: A unit of measure for levels of radon gas.

Pilot Tests: Testing a cleanup technology under actual site conditions to identify potential problems prior to full-scale implementation.

Plankton: Tiny plants and animals that live in water.

Plasma-arc Reactor: An incinerator that operates at extremely high temperatures; treats highly toxic wastes that do not burn easily.

Plasmid: A circular piece of DNA that exists apart from the chromosome and replicates independently of it. Bacterial plasmids carry information that renders the bacteria resistant to antibiotics. Plasmids are often used in genetic engineering to carry desired genes into organisms.

Plastics: Non-metallic chemoreactive compounds molded into rigid or pliable construction materials, fabrics, etc.

Plate Tower Scrubber: An air pollution control device that neutralizes hydrogen chloride gas by bubbling alkaline water through holes in a series of metal plates.

Plugging: Act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

Plume: 1. A visible or measurable discharge of a contaminant from a given point of origin. Can be visible or thermal in water, or visible in the air as, for example, a plume of smoke. 2 The area of radiation leaking from a damaged reactor. 3. Area downwind within which a release could be dangerous for those exposed to leaking fumes.

Plutonium: A radioactive metallic element chemically similar to uranium.

PM-10: A new standard for measuring the amount of solid or liquid matter suspended in the atmosphere, i.e. the amount of particulate matter over 10 micrometers in diameter; smaller PM-10 particles penetrate to the deeper portions of the lung, affecting sensitive population groups such as children and individuals with respiratory ailments.

Point Source: A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution, e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Pollen: The fertilizing element of flowering plants; background air pollutant.

Pollutant: Generally, any substance introduced into the environment that adversely affects the usefulness of a resource.

Pollution Prevention: The active process of identifying areas, processes, and activities which create excessive waste byproducts for the purpose of substitution, alteration, or elimination of the process to prevent waste generation.

Pollutant Standard Index (PSI): Measure of adverse health effects of air pollution levels in major cities.

Pollution: Generally, the presence of matter or energy whose nature, location, or quantity produces undesired environmental effects. Under the Clean Water Act, for example, the term is defined as the man-made or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.

Polonium: A radioactive element that occurs in pitchblende and other uranium-containing ores.

Polyelectrolytes: Synthetic chemicals that help solids to clump during sewage treatment.

Polymer: Basic molecular ingredients in plastic.

Polyvinyl Chloride (PVC): A tough, environmentally indestructible plastic that releases hydrochloric acid when burned.

Population: A group of interbreeding organisms occupying a particular space; the number of humans or other living creatures in a designated area.

Post-Closure: The time period following the shutdown of a waste management or manufacturing facility; for monitoring purposes, often considered to be 30 years.

Post-Consumer Recycling: Reuse of materials generated from residential and consumer waste, e.g. converting wastepaper from offices into corrugated boxes or newsprint.

Potable Water: Water that is safe for drinking and cooking.

Potentially Responsible Party (PRP): Any individual or company-including owners, operators, transporters or generators-potentially responsible for, or contributing to a spill or other contamination at a Superfund site. Whenever possible, through administrative and legal actions, EPA requires PRPs to clean up hazardous sites they have contaminated.

Precipitate: A solid that separates from a solution.

Precipitation: Removal of hazardous solids from liquid waste to permit safe disposal; removal of particles from airborne emissions.

Precipitator: Pollution control device that collects particles from an air stream.

Precursor: In photochemistry, a compound antecedent to a volatile organic compound (VOC). Precursors react in sunlight to form ozone or other photochemical oxidants.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release.

Pressure Sewers: A system of pipes in which water, wastewater, or other liquid is pumped to a higher elevation.

Pretreatment: Processes used to reduce, eliminate, or alter the nature of wastewater pollutants from non-domestic sources before they are discharged into publicly owned treatment works (POTWs).

Prevalent Level Samples: Air samples taken under normal conditions (also known as ambient background samples).

Prevalent Levels: Levels of airborne contaminant occurring under normal conditions.

Prevention of Significant Deterioration (PSD): EPA program in which state and/or federal permits are required in order to restrict emissions from new or modified sources in places where air quality already meets or exceeds primary and secondary ambient air quality standards.

Primary Drinking Water Regulation: Applies to public water systems and specifies a contaminant level, which, in the judgment of the EPA Administrator, will not adversely affect human health.

Primary Waste Treatment: First steps in wastewater treatment; screens and sedimentation tanks are used to remove most materials that float or will settle. Primary treatment removes about 30 percent of carbonaceous biochemical oxygen demand from domestic sewage.

Principal Organic Hazardous Constituents (POHCs): Hazardous compounds monitored during an incinerator's trial burn, selected for high concentration in the waste feed and difficulty of combustion.

Probability of Detection: The likelihood, expressed as a percentage, that a test method will correctly identify a leaking tank.

Process Verification: Verifying that process raw materials, water usage, waste treatment processes, production rate and other facts relative to quantity and quality of pollutants contained in discharges are substantially described in the permit application and the issued permit.

Process Wastewater: Any water that comes into contact with any raw material, product, byproduct, or waste.

Process Weight: Total weight of all materials, including fuel, used in a manufacturing process; used to calculate the allowable particulate emission rate.

Product Level: The level of a product in a storage tank.

Products of Incomplete Combustion (PICs): Organic compounds formed by combustion. Usually generated in small amounts and sometimes toxic, PICs are heat-altered versions of the original material fed into the incinerator (e.g., charcoal is a P.C. from burning wood).

Propellant: Liquid in a self-pressurized pesticide product that expels the active ingredient from its container.

Proposed Plan: A plan for a site cleanup that is available to the public for comment.

Proteins: Complex nitrogenous organic compounds of high molecular weight made of amino acids; essential for growth and repair of animal tissue. Many, but not all, proteins are enzymes.

Protocol: A series of formal steps for conducting a test.

Protoplast: A membrane-bound cell from which the outer wall has been partially or completely removed. The term often is applied to plant cells.

Protozoa: One-celled animals that are larger and more complex than bacteria. May cause disease.

Public Comment Period: The time allowed for the public to express its views and concerns regarding an action by EPA (e.g., a *Federal Register* Notice of proposed rule-making, a public notice of a draft permit, or a Notice of Intent to Deny).

Public Hearing: A formal meeting wherein EPA officials hear the public's views and concerns about an EPA action or proposal. EPA is required to consider such comments when evaluating its actions. Public hearings must be held upon request during the public comment period.

Public Notice: 1. Notification by EPA informing the public of Agency actions such as the issuance of a draft permit or scheduling of a hearing. EPA is required to ensure proper public notice, including publication in newspapers and broadcast over radio stations. 2. In the safe drinking water program, water suppliers are required to publish and broadcast notices when pollution problems are discovered.

Public Water System: A system that provides piped water for human consumption to at least 15 service connections or regularly serves 25 individuals.

Publicly Owned Treatment Works: A waste-treatment works owned by a state, unit of local government, or Indian tribe, usually designed to treat domestic wastewaters.

Pumping Station: Pumping devices installed in sewer or water systems or other liquid-carrying pipelines to move the liquids to a higher level.

Putrescible: Able to rot quickly enough to cause odors and attract flies.

Pyrolysis: Decomposition of a chemical by extreme heat.

Q

Quality Assurance/Quality Control: A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, other technical and reporting activities are of the highest achievable quality.

Quench Tank: A water-filled tank used to cool incinerator residues or hot materials during industrial processes.

R

Radiation Standards: Regulations that set maximum exposure limits for protection of the public from radioactive materials.

Radio Frequency Radiation: (See Non-ionizing Radiation.)

Radioactive Substances: Substances that emit ionizing radiation.

Radioisotopes: Chemical variants of an element with potentially oncogenic, teratogenic, and mutagenic effects on the human body.

Radionuclide: Radioactive particle, man-made or natural, with a distinct atomic weight number. Can have a long life as soil or water pollutants.

Radius of Vulnerability Zone: The maximum distance from the point of release of a hazardous substance in which the airborne concentration could reach the level of concern under specified weather conditions.

Radon Decay Products: A term used to refer collectively to the immediate products of the radon decay chain. These include Po-218, Pb-214, Bi-214, and Po-214, which have an average combined half-life of about 30 minutes.

Radon: A colorless naturally occurring, radioactive, inert gas formed by radioactive decay of radium atoms in soil or rocks.

Rasp: A machine that grinds waste into a manageable material and helps prevent odor.

Raw Sewage: Untreated wastewater and its contents.

Raw Water: Intake water prior to any treatment or use.

Reasonably Available Control Measures (RACM): A broadly defined term referring to technological and other measures for pollution control.

Reasonably Available Control Technology (RACT): Control technology that is both reasonably available, and both technologically and economically feasible. Usually applied to existing sources in nonattainment areas; in most cases is less stringent than new source performance standards.

Receiving Waters: A river, lake, ocean, stream or other watercourse into which wastewater or treated effluent is discharged.

Recharge: The process by which water is added to a zone of saturation, usually by percolation from the soil surface, e.g., the recharge of an aquifer.

Recharge Area: A land area in which water reaches the zone of saturation from surface infiltration, e.g., where rainwater soaks through the earth to reach an aquifer.

Recombinant Bacteria: A microorganism whose genetic makeup has been altered by deliberate introduction of new genetic elements. The offspring of these altered bacteria also contain these new genetic elements, i.e. they "breed true."

Recombinant DNA: The new DNA that is formed by combining pieces of DNA from different organisms or cells.

Recommended Maximum Contaminant Level (RMCL): The maximum level of a contaminant in drinking water at which no known or anticipated adverse affect on human health would occur, and that includes an adequate margin of safety. Recommended levels are nonenforceable health goals. (See: maximum contaminant level.)

Reconstructed Source: Facility in which components are replaced to such an extent that the fixed capital cost of the new components exceed 50 percent of the capital cost of constructing a comparable brand-new facility. New-source performance standards may be applied to sources reconstructed after the proposal of the standard if it is technologically and economically feasible to meet the standard.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used at National Priorities List sites where, under CERCLA, Trust Funds pay for the cleanup.

Recovery Rate: Percentage of usable recycled materials that have been removed from the total amount of municipal solid waste generated in a specific area or by a specific business.

Reclamation: (In recycling) Restoration of materials found in the waste stream to a beneficial use which may be for purposes other than the original use.

Recycle/Reuse: Minimizing waste generation by recovering and reprocessing usable products that might otherwise become waste (i.e. recycling of aluminum cans, paper, and bottles, etc.).

Red Bag Waste: (See: infectious waste.)

Red Border: An EPA document undergoing review before being submitted for final management decision-making.

Red Tide: A proliferation of a marine plankton toxic and often fatal to fish; perhaps stimulated by the addition of nutrients. A tide can be red, green, or brown, depending on the coloration of the plankton.

Reentry Interval: The period of time immediately following the application of a pesticide during which unprotected workers should not enter a field.

Reference Dose (RfD): The concentration of a chemical known to cause health problems; also be referred to as the ADI, or acceptable daily intake.

Reformulated Gasoline: Gasoline with a different composition from conventional gasoline (e.g., lower aromatics content) that cuts air pollutants.

Refuse Reclamation: Conversion of solid waste into useful products, e.g., composting organic wastes to make soil conditioners or separating aluminum and other metals for recycling.

Refuse: (See: solid waste.)

Regeneration: Manipulation of cells to cause them to develop into whole plants.

Regional Response Team (RRT): Representatives of federal, local, and state agencies who may assist in coordination of activities at the request of the On-Scene Coordinator before and during a significant pollution incident such as an oil spill, major chemical release, or a Superfund response.

Registrant: Any manufacturer or formulator who obtains registration for a pesticide active ingredient or product.

Registration: Formal listing with EPA of a new pesticide before it can be sold or distributed. Under the Federal Insecticide, Fungicide, and Rodenticide Act. EPA is responsible for registration (pre-market licensing) of pesticides on the basis of data demonstrating no unreasonable adverse effects on human health or the environment when applied according to approved label directions.

Registration Standards: Published documents which include summary reviews of the data available on a pesticide's active ingredient, data gaps, and the Agency's existing regulatory position on the pesticide.

Regulated Asbestos-Containing Material (RACM): Friable asbestos material or nonfriable ACM that will be or has been subjected to sanding, grinding, cutting, or abrading or has crumbled, or been pulverized or reduced to powder in the course of demolition or renovation operations.

Regulated Medical Waste: Under the Medical Waste Tracking Act of 1988, any solid waste generated in the diagnosis, treatment, or immunization of human beings or animals, in research pertaining thereto, or in the production or testing of biologicals. Included are cultures and stocks of infectious agents; human blood and blood products; human pathological body wastes from surgery and autopsy; contaminated animal carcasses from medical research; waste from patients with communicable diseases; and all used sharp implements, such as needles and scalpels, etc., and certain unused sharps. (See: treated medical waste; untreated medical waste; destroyed medical waste.)

Release: Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous or toxic chemical or extremely hazardous substance.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Remedial Design: A phase of remedial action that follows the remedial investigation/feasibility study and includes development of engineering drawings and specifications for a site cleanup.

Remedial Investigation: An in-depth study designed to gather data needed to determine the nature and extent of contamination at a Superfund site; establish site cleanup criteria; identify preliminary alternatives for remedial action; and support technical and cost analyses of alternatives. The remedial investigation is usually done with the feasibility study. Together they are usually referred to as the "RI/FS".

Remedial Project Manager (RPM): The EPA or state official responsible for overseeing on-site remedial action.

Remedial Response: Long-term action that stops or substantially reduces a release or threat of a release of hazardous substances that is serious but not an immediate threat to public health.

Remediation: 1. Cleanup or other methods used to remove or contain a toxic spill or hazardous materials from a Superfund site; 2. for the Asbestos Hazard Emergency Response program, abatement methods including evaluation, repair, enclosure, encapsulation, or removal of greater than 3 linear feet or square feet of asbestos-containing materials from a building.

Remote Sensing: The collection and interpretation of information about an object without physical contact with the object; e.g., satellite imaging and aerial photograph.

Removal Action: Short-term immediate actions taken to address releases of hazardous substances that require expedited response. (See: cleanup.)

Reportable Quantity (RQ): Quantity of a hazardous substance that triggers reports under CERCLA. If a substance exceeds its RQ, the release must be reported to the National Response Center, the SERC, and community emergency coordinators for areas likely to be affected.

Repowering: Replacement of an existing coal-fired boiler with one or more clean coal technologies in order to achieve significantly greater emission reduction relative to the performance of technology in widespread use at the time the Clean Air Act amendments of 1990 were enacted. (See: Clean coal technology.)

Reregistration: The reevaluation and relicensing of existing pesticides originally registered prior to current scientific and regulatory standards. EPA reregisters pesticides through its Registration Standards Program.

Reserve Capacity: Extra treatment capacity built into solid waste and wastewater treatment plants and interceptor sewers to accommodate flow increases due to future population growth.

Reservoir: Any natural or artificial holding area used to store, regulate, or control water.

Residual: Amount of a pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or particulates remaining in air after it passes through a scrubbing or other process.

Residual Risk: The extent of health risk from air pollutants remaining after application of the Maximum Achievable Control Technology (MACT).

Resistance: For plants and animals, the ability to withstand poor environmental conditions or attacks by chemicals or disease. May be inborn or acquired.

Resource Recovery: The process of obtaining matter or energy from materials formerly discarded.

Response Action: 1. Generic term for actions taken in response to actual or potential health-threatening environmental events such as spills, sudden releases, and asbestos abatement/management problems; 2. A CERCLA-authorized action involving either a short-term removal action or a long-term removal response. This may include but is not limited to: removing hazardous materials from a site to an EPA-approved hazardous waste facility for treatment, containment or treating the waste on-site, identifying and removing the sources of ground-water contamination and halting further migration of contaminants; 3. Any of the following actions taken in school buildings in response to AHERA to reduce the risk of exposure to asbestos: removal, encapsulation, enclosure, repair, and operations and maintenance. (See: cleanup.)

Responsiveness Summary: A summary of oral and/or written public comments received by EPA during a comment period on key EPA documents, and EPA's response to those comments.

Restoration: Measures taken to return a site to pre-violation conditions.

Restricted Use: A pesticide may be classified (under FIFRA regulations) for restricted use if it requires special handling because of its toxicity, and, if so, it may be applied only by trained, certified applicators or those under their direct supervision.

Restriction Enzymes: Enzymes that recognize specific regions of a long DNA molecule and cut it at those points.

Reuse: Using a product or component of municipal solid waste in its original form more than once, e.g., refilling a glass bottle that has been returned or using a coffee can to hold nuts and bolts.

Reverse Osmosis: A treatment process used in water systems by adding pressure to force water through a semi-permeable membrane. Reverse osmosis removes most drinking water contaminants. Also used in wastewater treatment. Large-scale reverse osmosis plants are being developed.

Ribonucleic Acid (RNA): A molecule that carries the genetic message from DNA to a cellular protein-producing mechanism.

Ringlemann Chart: A series of shaded illustrations used to measure the opacity of air pollution emissions, ranging from light grey through black; used to set and enforce emissions standards.

Riparian Habitat: Areas adjacent to rivers and streams with a high density, diversity, and productivity of plant and animal species relative to nearby uplands.

Riparian Rights: Entitlement of a land owner to certain uses of water on or bordering his property, including the right to prevent diversion or misuse of upstream waters. Generally a matter of state law.

Risk: A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Risk Communication: The exchange of information about health or environmental risks among risk assessors and managers, the general public, news media, interest groups, etc.

Risk Management: The process of evaluating and selecting alternative regulatory and non-regulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

River Basin: The land area drained by a river and its tributaries.

Rodenticide: A chemical or agent used to destroy rats or other rodent pests, or to prevent them from damaging food, crops, etc.

Rotary Kiln Incinerator: An incinerator with a rotating combustion chamber that keeps waste moving, thereby allowing it to vaporize for easier burning.

Rough Fish: Fish not prized for eating, such as gar and suckers. Most are more tolerant of changing environmental conditions than game species.

Rubbish: Solid waste, excluding food waste and ashes, from homes, institutions, and work-places.

Run-Off: That part of precipitation, snow melt, or irrigation water that runs off the land into streams or other surface-water. It can carry pollutants from the air and land into receiving waters.

S

Safener: A chemical added to a pesticide to keep it from injuring plants.

Salinity: The percentage of salt in water.

Salt Water Intrusion: The invasion of fresh surface or ground water by salt water. If it comes from the ocean it may be called sea water intrusion.

Salts: Minerals that water picks up as it passes through the air, over and under the ground, or from households and industry.

Salvage: The utilization of waste materials.

Sanctions: Actions taken by the federal government for failure to plan or implement a State Improvement Plan (SIP). Such action may be include withholding of highway funds and a ban on construction of new sources of potential pollution.

Sand Filters: Devices that remove some suspended solids from sewage. Air and bacteria decompose additional wastes filtering through the sand so that cleaner water drains from the bed.

Sanitary Landfill: (See: landfills.)

Sanitary Sewers: Underground pipes that carry off only domestic or industrial waste, not storm water.

Sanitary Survey: An on-site review of the water sources, facilities, equipment, operation and maintenance of a public water system to evaluate the adequacy of those elements for producing and distributing safe drinking water.

Sanitary Water (Also known as gray water): Water discharged from sinks, showers, kitchens, or other nonindustrial operations, but not from commodes.

Sanitation: Control of physical factors in the human environment that could harm development, health, or survival.

Saturated Zone: A subsurface area in which all pores and cracks are filled with water under pressure equal to or greater than that of the atmosphere.

Scrap: Materials discarded from manufacturing operations that may be suitable for reprocessing.

Screening: Use of screens to remove coarse floating and suspended solids from sewage.

Science Advisory Board (SAB): A group of external scientists who advise EPA on science and policy.

Scrubber: An air pollution device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Secondary Drinking Water Regulations: Non-enforceable regulations applying to public water systems and specifying the maximum contamination levels that, in the judgment of EPA, are required to protect the public welfare. These regulations apply to any contaminants that may adversely affect the odor or appearance of such water and consequently may cause people served by the system to discontinue its use.

Secondary Materials: Materials that have been manufactured and used at least once and are to be used again.

Secondary Treatment: The second step in most publicly owned waste treatment systems in which bacteria consume the organic parts of the waste. It is accomplished by bringing together waste, bacteria, and oxygen in trickling filters or in the activated sludge process. This treatment removes floating and settleable solids and about 90 percent of the oxygen-demanding substances and suspended solids. Disinfection is the final stage of secondary treatment. (See: primary, tertiary treatment.)

Secure Chemical Landfill: (See: landfills.)

Secure Maximum Contaminant Level: Maximum permissible level of a contaminant in water delivered to the free flowing outlet of the ultimate user, or of contamination resulting from corrosion of piping and plumbing caused by water quality.

Sedimentation Tanks: Wastewater tanks in which floating wastes are skimmed off and settled solids are removed for disposal.

Sedimentation: Letting solids settle out of wastewater by gravity during treatment.

Sediments: Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers and harbors, destroying fish and wildlife habitat, and clouding the water so that sunlight cannot reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to wash off the land after rainfall.

Seed Protectant: A chemical applied before planting to protect seeds and seedlings from disease or insects.

Seepage: Percolation of water through the soil from unlined canals, ditches, laterals, watercourses, or water storage facilities.

Selective Pesticide: A chemical designed to affect only certain types of pests, leaving other plants and animals unharmed.

Semi-Confined Aquifer: An aquifer partially confined by soil layers of low permeability through which recharge and discharge can still occur.

Senescence: The aging process. Sometimes used to describe lakes or other bodies of water in advanced stages of eutrophication.

Septic Tank: An underground storage tank for wastes from homes not connected to a sewer line. Waste goes directly from the home to the tank, where it is decomposed by bacteria. The sludge settles to the bottom and is pumped out periodically, but effluent flows into the ground through drains.

Service Connector: The pipe that carries tap water from a public water main to a building.

Settleable Solids: Material heavy enough to sink to the bottom of a wastewater treatment tank.

Settling Chamber: A series of screens placed in the way of flue gases to slow the stream of air, thus helping gravity to pull particles into a collection device.

Settling Tank: A holding area for wastewater, where heavier particles sink to the bottom for removal and disposal.

7Q10: Seven-day, consecutive low flow with a ten year return frequency; the lowest stream flow for seven consecutive days that would be expected to occur once in ten years.

Sewage: The waste and wastewater produced by residential and commercial sources and discharged into sewers.

Sewage Lagoon: (See: lagoon.)

Sewage Sludge: Sludge produced at a Publicly Owned Treatment Works, the disposal of which is regulated under the Clean Water Act.

Sewer: A channel or conduit that carries wastewater and storm-water runoff from the source to a treatment plant or receiving stream. "Sanitary" sewers carry household, industrial, and commercial waste. "Storm" sewers carry runoff from rain or snow. "Combined" sewers handle both.

Sewerage: The entire system of sewage collection, treatment, and disposal.

Sharps: Hypodermic needles, syringes (with or without the attached needle) pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes used in animal or human patient care or treatment, or in medical, research or industrial laboratories. Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides and cover slips, and unused hypodermic and suture needles, syringes, and scalpel blades.

Signal: The volume or product-level change produced by a leak in a tank.

Signal Words: The words used on a pesticide label-Danger, Warning, Caution-to indicate level of toxicity.

Significant Deterioration: Pollution resulting from a new source in previously "clean" areas. (See: prevention of significant deterioration.)

Significant Municipal Facilities: Those publicly owned sewage treatment plants that discharge a million gallons per day or more and are therefore considered by states to have the potential for to substantially effect the quality of receiving waters.

Significant Non-Compliance: (See Significant Violations.)

Significant Violations: Violations by point source dischargers of sufficient magnitude or duration to be a regulatory priority.

Silviculture: Management of forest land for timber. Sometimes contributes to water pollution, as in clear-cutting.

Sinking: Controlling oil spills by using an agent to trap the oil and sink it to the bottom of the body of water where the agent and the oil are biodegraded.

Site Assessment Program: A means of evaluating hazardous waste sites through preliminary assessments and site inspections to develop a Hazard Ranking System score.

Site Inspection: The collection of information from a Superfund site to determine the extent and severity of hazards posed by the site. It follows and is more extensive than a preliminary assessment. The purpose is to gather information necessary to score the site, using the Hazard Ranking System, and to determine if it presents an immediate threat requiring prompt removal.

Site Safety Plan: A crucial element in all removal actions, it includes information on equipment being used, precautions to be taken, and steps to take in the event of an on-site emergency.

Siting: The process of choosing a location for a facility.

Skimming: Using a machine to remove oil or scum from the surface of the water.

Slow Sand Filtration: Passage of raw water through a bed of sand at low velocity, resulting in substantial removal of chemical and biological contaminants.

Sludge: A semi-solid residue from any of a number of air or water treatment processes; can be a hazardous waste.

Sludge Digester: Tank in which complex organic substances like sewage sludges are biologically dredged. During these reactions, energy is released and much of the sewage is converted to methane, carbon dioxide, and water.

Slurry: A watery mixture of insoluble matter resulting from some pollution control techniques.

Small Quantity Generator (SQG-sometimes referred to as "Squeegee"): Persons or enterprises that produce 220-2200 pounds per month of hazardous waste; are required to keep more records than conditionally exempt generators. The largest category of hazardous waste generators, SQGs include automotive shops, dry cleaners, photographic developers, and a host of other small businesses. (See: conditionally exempt generators).

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution. "Smelting" is the process involved.

Smog: Air pollution associated with oxidants. (See: photochemical smog.)

Smoke: Particles suspended in air after incomplete combustion.

Soft Detergents: Cleaning agents that break down in nature.

Soft Water: Any water that does not contain a significant amount of dissolved minerals such as salts of calcium or magnesium.

Soil Adsorption Field: A sub-surface area containing a trench or bed with clean stones and a system of piping through which treated sewage may seep into the surrounding soil for further treatment and disposal.

Soil and Water Conservation Practices: Control measures consisting of managerial, vegetative, and structural practices to reduce the loss of soil and water.

Soil Conditioner: An organic material like humus or compost that helps soil absorb water, build a bacterial community, and take up mineral nutrients.

Soil Erodibility: An indicator of a soil's susceptibility to raindrop impact, runoff, and other erosive processes.

Soil Gas: Gaseous elements and compounds in the small spaces between particles of the earth and soil. Such gases can be moved or driven out under pressure.

Soil Sterilant: A chemical that temporarily or permanently prevents the growth of all plants and animals, depending on the chemical.

Sole-Source Aquifer: An aquifer that supplies 50-percent or more of the drinking water of an area.

Solid Waste: Non-liquid, non-soluble materials ranging from municipal garbage to industrial wastes that contain complex and sometimes hazardous substances. Solid wastes also include sewage sludge, agricultural refuse, demolition wastes, and mining residues. Technically, solid waste also refers to liquids and gases in containers.

Solid Waste Disposal: The final placement of refuse that is not salvaged or recycled.

Solid Waste Management: Supervised handling of waste materials from their source through recovery processes to disposal.

Solidification and Stabilization: Removal of wastewater from a waste or changing it chemically to make it less permeable and susceptible to transport by water.

Soot: Carbon dust formed by incomplete combustion.

Sorption: The action of soaking up or attracting substances; process used in many pollution control systems.

Source Reduction: Reducing the amount of materials entering the waste stream by redesigning products or patterns of production or consumption (e.g., using returnable beverage containers). Synonymous with waste reduction.

Source Separation: Segregating various wastes at the point of generation (e.g., separation of paper, metal and glass from other wastes to make recycling simpler and more efficient.)

Special Review: Formerly known as Rebuttable Presumption Against Registration (RPAR), this is the regulatory process through which existing pesticides suspected of posing unreasonable risks to human health, non-target organisms, or the environment are referred for review by EPA. Such review requires an intensive risk/benefit analysis with opportunity for public comment. If risk is found to outweigh social and economic benefits, regulatory actions ranging from label revisions and use-restriction to cancellation or suspended registration can be initiated.

Special Waste: Items such as household hazardous waste, bulky wastes (refrigerators, pieces of furniture, etc.) tires, and used oil.

Species: A reproductively isolated aggregate of interbreeding organisms.

Spill Prevention Control and Countermeasures Plan (SPCP): Plan covering the release of hazardous substances as defined in the Clean Water Act.

Spoil: Dirt or rock removed from its original location-destroying the composition of the soil in the process-as in strip-mining, dredging, or construction.

Sprawl: Unplanned development of open land.

Spray Tower Scrubber: A device that sprays alkaline water into a chamber where acid gases present to aid in the neutralizing of the gas.

Stable Air: A motionless mass of air that holds instead of dispersing pollutants.

Stabilization: Conversion of the active organic matter in sludge into inert, harmless material.

Stack: A chimney, smokestack, or vertical pipe that discharges used air.

Stabilization Ponds: (See: lagoon.)

Stack Effect: Air, as in a chimney, that moves upward because it is warmer than the ambient atmosphere.

Stack Gas: (See: flue gas.)

Stage II Controls: Systems placed on service station gasoline pumps to control and capture gasoline vapors during refueling.

Stagnation: Lack of motion in a mass of air or water that holds pollutants in place.

Standards: Norms that impose limits on the amount of pollutants or emissions produced. EPA establishes minimum standards, but states are allowed to be stricter.

Start of a Response Action: The point in time when there is a guarantee or set-aside of funding either by EPA, other federal agencies, states or Principal Responsible Parties in order to begin response actions at a Superfund site.

State Emergency Response Commission (SERC): Commission appointed by each state governor according to the requirements of SARA Title III. The SERCs designate emergency planning districts, appoint local emergency planning committees, and supervise and coordinate their activities.

State Implementation Plans (SIP): EPA approved state plans for the establishment, regulation, and enforcement of air pollution standards.

Stationary Source: A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes.

Storage: Temporary holding of waste pending treatment or disposal, as in containers, tanks, waste piles, and surface impoundments.

Storm Sewer: A system of pipes (separate from sanitary sewers) that carries only water runoff from buildings and land surfaces.

Stratification: Separating into layers.

Stratosphere: The portion of the atmosphere 10-to-25 miles above the earth's surface.

Strip-Cropping: Growing crops in a systematic arrangement of strips or bands that serve as barriers to wind and water erosion.

Strip-Mining: A process that uses machines to scrape soil or rock away from mineral deposits just under the earth's surface.

Structural Deformation: Distortion in walls of a tank after liquid has been added or removed.

Sulfur Dioxide (SO₂): A pungent, colorless, gaseous pollutant formed primarily by the combustion of fossil fuels.

Sump: A pit or tank that catches liquid runoff for drainage or disposal.

Supercritical Water: A type of thermal treatment using moderate temperatures and high pressures to enhance the ability of water to break down large organic molecules into smaller, less toxic ones. Oxygen injected during this process combines with simple organic compounds to form carbon dioxide and water.

Superfund: The program operated under the legislative authority of CERCLA and SARA that funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising the cleanup and other remedial actions.

Superfund Innovative Technology Evaluation: EPA program to promote development and use of innovative treatment technologies in Superfund site cleanups.

Surface Impoundment: Treatment, storage, or disposal of liquid hazardous wastes in ponds.

Surface Uranium Mines: Strip mining operations for removal of uranium-bearing ore.

Surface Water: All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.) and all springs, wells, or other collectors directly influenced by surface water.

Surfacing ACM: Asbestos-containing material that is sprayed or troweled on or otherwise applied to surfaces, such as acoustical plaster on ceilings and fireproofing materials on structural members.

Surfacing Material: Material sprayed or troweled onto structural members (beams, columns, or decking) for fire protection; or on ceilings or walls for fireproofing, acoustical or decorative purposes. Includes textured plaster, and other textured wall and ceiling surfaces.

Surfactant: A detergent compound that promotes lathering.

Surveillance System: A series of monitoring devices designed to check on environmental conditions.

Suspect Material: Building material suspected of containing asbestos, e.g., surfacing material, floor tile, ceiling tile, thermal system insulation, and miscellaneous other materials.

Suspended Loads: Sediment particles maintained in the water column by turbulence and carried with the flow of water.

Suspended Solids: Small particles of solid pollutants that float on the surface of, or are suspended in, sewage or other liquids. They resist removal by conventional means.

Suspension: Suspending the use of a pesticide when EPA deems it necessary to prevent an imminent hazard resulting from its continued use. An emergency suspension takes effect immediately; under an ordinary suspension a registrant can request a hearing before the suspension goes into effect. Such a hearing process might take six months.

Suspension Culture: Cells growing in a liquid nutrient medium.

Swamp: A type of wetland dominated by woody vegetation but without appreciable peat deposits. Swamps may be fresh or salt water and tidal or non-tidal. (See: wetlands.)

Synthetic Organic Chemicals (SOCs): Man-made organic chemicals. Some SOC's are volatile, others tend to stay dissolved in water instead of evaporating.

Systemic Pesticide: A chemical absorbed by an organism that makes the organism toxic to pests.

T

Tailings: Residue of raw material or waste separated out during the processing of crops or mineral ores.

Tail Water: The runoff of irrigation water from the lower end of an irrigated field.

Technical Assistance Grant (TAG): As part of the Superfund program, Technical Assistance Grants of up to \$50,000 are provided to citizens' groups to obtain assistance in interpreting information related to cleanups at Superfund sites or those proposed for the National Priorities List. Grants are used by such groups to hire technical advisors to help them understand the site-related technical information for the duration of response activities.

Technology-Based Limitations: Industry-specific effluent limitations applied to a discharge when it will not cause a violation of water quality standards at low stream flows. Usually applied to discharges into large rivers.

Technology-Based Standards: Effluent limitations applicable to direct and indirect sources which are developed on a category-by-category basis using statutory factors, not including water-quality effects.

Terracing: Dikes built along the contour of sloping farm land that hold runoff and sediment to reduce erosion.

Tertiary Treatment: Advanced cleaning of wastewater that goes beyond the secondary or biological stage, removing nutrients such as phosphorus, nitrogen, and most BOD and suspended solids.

Thermal Pollution: Discharge of heated water from industrial processes that can kill or injure aquatic organisms.

Thermal System Insulation (TSI): Asbestos-containing material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain or water condensation.

Thermal Treatment: Use of elevated temperatures to treat hazardous wastes. (See: incineration; pyrolysis.)

Threshold Limit Value (TLV): The concentration of an airborne substance that an average person can be repeatedly exposed to without adverse effects. TLVs may be expressed in three ways: TLV-TWA-Time weighted average, based on an allowable exposure averaged over a normal 8-hour workday or 40-hour workweek; TLV-STEL-Short-term exposure limit or maximum concentration for a brief specified period of time, depending on a specific chemical (TWA must still be met); and TLV-C-Ceiling Exposure Limit or maximum exposure concentration not to be exceeded under any circumstances. (TWA must still be met.)

Threshold Planning Quantity: A quantity designated for each chemical on the list of extremely hazardous substances that triggers notification by facilities to the State Emergency Response Commission that such facilities are subject to emergency planning requirements under SARA Title III.

Tidal Marsh: Low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation; normally, the only vegetation present is salt-tolerant bushes and grasses. (See: wetlands.)

Time-weighted Average (TWA): In air sampling, the average air concentration of contaminants during a given period.

Tolerances: Permissible residue levels for pesticides in raw agricultural produce and processed foods. Whenever a pesticide is registered for use on a food or a feed crop, a tolerance (or exemption from the tolerance requirement) must be established. EPA establishes the tolerance levels, which are enforced by the Food and Drug Administration and the Department of Agriculture.

Tonnage: The amount of waste that a landfill accepts, usually expressed in tons per month. The rate at which a landfill accepts waste is limited by the landfill's permit.

Topography: The physical features of a surface area including relative elevations and the position of natural and man-made features.

Total Dissolved Phosphorous: The total phosphorous content of all material that will pass through a filter, which is determined as orthophosphate without prior digestion or hydrolysis. Also called soluble P. or ortho P.

Total Dissolved Solids (TDS): All material that passes the standard glass river filter; now called total filtrable residue. Term is used to reflect salinity.

Total Suspended Solids (TSS): A measure of the suspended solids in wastewater, effluent, or water bodies, determined by tests for "total suspended non-filterable solids." (See: suspended solids.)

Toxic Chemical Release Form: Information form required of facilities that manufacture, process, or use (in quantities above a specific amount) chemicals listed under SARA Title III.

Toxic Chemical: Any chemical listed in EPA rules as "Toxic Chemicals Subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986."

Toxic Chemical Use Substitution: Replacing toxic chemicals with less harmful chemicals in industrial processes.

Toxic Cloud: Airborne plume of gases, vapors, fumes, or aerosols containing toxic materials.

Toxic Pollutants: Materials that cause death, disease, or birth defects in organisms that ingest or absorb them. The quantities and exposures necessary to cause these effects can vary widely.

Toxic Release Inventory: Database of toxic releases in the United States compiled from SARA Title III section 313 reports.

Toxic Substance: A chemical or mixture that may present an unreasonable risk of injury to health or the environment.

Toxic Waste: A waste that can produce injury if inhaled, swallowed, or absorbed through the skin.

Toxicity Testing: Biological testing (usually with an invertebrate, fish, or small mammal) to determine the adverse effects of a compound or effluent.

Toxicological Profile: An examination, summary, and interpretation of a hazardous substance to determine levels of exposure and associated health effects.

Transpiration: The process by which water vapor is lost to the atmosphere from living plants. The term can also be applied to the quantity of water thus dissipated.

Transportation Control Measures (TCMs): Steps taken by a locality to adjust traffic patterns (e.g., bus lanes, turnout, right turn on red) or reduce vehicle use (ride sharing, high-occupancy vehicle lanes) to cut vehicular emissions.

Trash: Material considered worthless or offensive that is thrown away. Generally defined as dry waste material, but in common usage it is a synonym for garbage, rubbish, or refuse.

Treatability Studies: Tests of potential cleanup technologies conducted in a laboratory (See: bench-scale tests.)

Trash-to-Energy Plan: Burning trash to produce energy.

Treated Regulated Medical Waste: Medical waste treated to substantially reduce or eliminate its pathogenicity, but that has not yet been destroyed.

Treatment Plant: A structure built to treat wastewater before discharging it into the environment.

Treatment, Storage, and Disposal Facility: Site where a hazardous substance is treated, stored, or disposed of. TSD facilities are regulated by EPA and states under RCRA.

Treatment: (1) Any method, technique, or process designed to remove solids and/or pollutants from solid waste, wastestreams, effluents, and air emissions. (2) methods used to change the biological character or composition of any regulated medical waste so as to substantially reduce or eliminate its potential for causing disease.

Trial Burn: An incinerator test in which emissions are monitored for the presence of specific organic compounds, particulates, and hydrogen chloride.

Trichloroethylene (TCE): A stable, low boiling-point colorless liquid, toxic if inhaled. Used as a solvent or metal decreasing agent, and in other industrial applications.

Trickling Filter: A coarse treatment system in which wastewater is trickled over a bed of stones or other material covered with bacteria that break down the organic waste and produce clean water.

Trickle Irrigation: Method in which water drips to the soil from perforated tubes or emitters.

Trihalomethane (THM): One of a family of organic compounds named as derivative of methane. THMs are generally by-products of chlorination of drinking water that contains organic material.

Trust Fund (CERCLA): A fund set up under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) to help pay for cleanup of hazardous waste sites and for legal action to force those responsible for the sites to clean them up.

Tundra: A type of ecosystem dominated by lichens, mosses, grasses, and woody plants. Tundra is found at high latitudes (arctic tundra) and high altitudes (alpine tundra). Arctic tundra is underlain by permafrost and is usually saturated. (See: wetlands.)

Turbidimeter: A device that measures the density of suspended solids in a liquid.

Turbidity: 1. Haziness in air caused by the presence of particles and pollutants. 2. A cloudy condition in water due to suspended silt or organic matter.

Ultra Clean Coal (UCC): Coal that is washed, ground into fine particles, then chemically treated to remove sulfur, ash, silicone, and other substances; usually briquetted and coated with a sealant made from coal.

Ultraviolet Rays: Radiation from the sun that can be useful or potentially harmful. UV rays from one part of the spectrum (UV-A) enhance plant life and are useful in some medical and dental procedures; UV rays from other parts of the spectrum (UV-B) can cause skin cancer or other tissue damage. The ozone layer in the atmosphere partly shields us from ultraviolet rays reaching the earth's surface.

Underground Injection Control (UIC): The program under the Safe Drinking Water Act that regulates the use of wells to pump fluids into the ground.

Underground Sources of Drinking Water: Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solids content of 10,000 milligrams per liter or less, and are not "exempted aquifers." (See: exempted aquifer.)

Underground Storage Tank: A tank located at least partially underground and designed to hold gasoline or other petroleum products or chemicals.

Unreasonable Risk: Under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), "unreasonable adverse effects" means any unreasonable risk to man or the environment, taking into account the medical, economic, social, and environmental costs and benefits of any pesticide.

Unsaturated Zone: The area above the water table where soil pores are not fully saturated, although some water may be present.

Uranium Mill Tailings Piles: Former uranium ore processing sites that contain leftover radioactive materials (wastes), including radium and unrecovered uranium.

Uranium Mill-Tailings Waste Piles: Licensed active mills with tailings piles and evaporation ponds created by acid or alkaline leaching processes.

Urban Runoff: Storm water from city streets and adjacent domestic or commercial properties that carries pollutants of various kinds into the sewer systems and receiving waters.

Utility Load: The total electricity demand for a utility district.

V

Vapor Capture System: Any combination of hoods and ventilation system that captures or contains organic vapors so they may be directed to an abatement or recovery device.

Vapor Dispersion: The movement of vapor clouds in air due to wind, thermal action, gravity spreading, and mixing.

Vapor Plumes: Flue gases visible because they contain water droplets.

Variance: Government permission for a delay or exception in the application of a given law, ordinance, or regulation.

Vector: 1. An organism, often an insect or rodent, that carries disease. 2. Plasmids, viruses, or bacteria used to transport genes into a host cell. A gene is placed in the vector; the vector then "infects" the bacterium.

Vehicle Miles Travelled (VMT): A measure of the extent of motor vehicle operation; the total number of vehicle miles travelled within a specific geographic area over a given period of time.

Ventilation/Suction: The act of admitting fresh air into a space in order to replace stale or contaminated air; achieved by blowing air into the space. Similarly, suction represents the admission of fresh air into an interior space by lowering the pressure outside of the space, thereby drawing the contaminated air outward.

Venturi Scrubbers: Air pollution control devices that use water to remove particulate matter from emissions.

Vinyl Chloride: A chemical compound, used in producing some plastics, that is believed to be oncogenic.

Virgin Materials: Resources extracted from nature in their raw form, such as timber or metal ore.

Volatile: Any substance that evaporates readily.

Volatile Organic Compound (VOC): Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

Volatile Synthetic Organic Chemicals: Chemicals that tend to volatilize or evaporate.

Volume Reduction: Processing waste materials to decrease the amount of space they occupy, usually by compacting or shredding, incineration, or composting.

Volumetric Tank Test: One of several tests to determine the physical integrity of a storage tank; the volume of fluid in the tank is measured directly or calculated from product-level changes. A marked drop in volume indicates a leak.

Vulnerable Zone: An area over which the airborne concentration of a chemical accidentally released could reach the level of concern.

Vulnerability Analysis: Assessment of elements in the community that are susceptible to damage should a release of hazardous materials occur.

W

Waste: 1. Unwanted materials left over from a manufacturing process. 2. Refuse from places of human or animal habitation.

Waste Characterization: Identification of chemical and microbiological constituents of a waste material.

Waste Exchange: Arrangement in which companies exchange their wastes for the benefit of both parties.

Waste Feed: The continuous or intermittent flow of wastes into an incinerator.

Waste Load Allocation: The maximum load of pollutants each discharger of waste is allowed to release into a particular waterway. Discharge limits are usually required for each specific water quality criterion being, or expected to be, violated. The portion of a stream's total assimilative capacity assigned to an individual discharge.

Waste Minimization: Measures or techniques that reduce the amount of wastes generated during industrial production processes; term is also applied to recycling and other efforts to reduce the amount of waste going into the waste stream.

Waste Reduction: Using source reduction, recycling, or composting to prevent or reduce waste generation.

Waste Stream: The total flow of solid waste from homes, businesses, institutions, and manufacturing plants that are recycled, burned, or disposed of in landfills, or segments thereof such as the "residential waste stream" or the "recyclable waste stream."

Waste Treatment Lagoon: Impoundment made by excavation or earth fill for biological treatment of wastewater.

Waste Treatment Plant: A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed from water.

Waste Treatment Stream: The continuous movement of waste from generator to treater and disposer.

Wastewater: The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Wastewater Infrastructure: The plan or network for the collection, treatment, and disposal of sewage in a community. The level of treatment will depend on the size of the community, the type of discharge, and/or the designated use of the receiving water.

Wastewater Operations and Maintenance: Actions taken after construction to assure that facilities constructed to treat wastewater will be operated, maintained, and managed to reach prescribed effluent levels in an optimum manner.

Water Pollution: The presence in water of enough harmful or objectionable material to damage the water's quality.

Water Purveyor: A public utility, mutual water company, county water district, or municipality that delivers drinking water to customers.

Water Quality Criteria: Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, farming, fish production, or industrial processes.

Water Quality Standards: State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Water Quality-Based Limitations: Effluent limitations applied to dischargers when mere technology-based limitations would cause violations of water quality standards. Usually applied to discharges into small streams.

Water Quality-Based Permit: A permit with an effluent limit more stringent than one based on technology performance. Such limits may be necessary to protect the designated use of receiving waters (i.e., recreation, irrigation, industry or water supply).

Water Solubility: The maximum possible concentration of a chemical compound dissolved in water. If a substance is water soluble it can very readily disperse through the environment.

Water Supplier: One who owns or operates a public water system.

Water Supply System: The collection, treatment, storage, and distribution of potable water from source to consumer.

Water Table: The level of groundwater.

Watershed: The land area that drains into a stream.

Well Injection: The subsurface emplacement of fluids into a well.

Well Monitoring: Measurement by on-site instruments or laboratory methods of well water quality.

Well Plug: A watertight, gastight seal installed in a bore hole or well to prevent movement of fluids.

Wellhead Protection Area: A protected surface and subsurface zone surrounding a well or wellfield supplying a public water system to keep contaminants from reaching the well water.

Wetlands: An area that is saturated by surface or ground water with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries.

Wildlife Refuge: An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

Wood-Burning-Stove Pollution: Air pollution caused by emissions of particulate matter, carbon monoxide, total suspended particulates, and polycyclic organic matter from wood-burning stoves.

Wood Treatment Facility: An industrial facility that treats lumber and other wood products for outdoor use. The process employs chromated copper arsenate, which is regulated as a hazardous material.

Working Level Month (WLM): A unit of measure used to determine cumulative exposure to radon.

Working Level (WL): A unit of measure for documenting exposure to radon decay products, the so-called "daughters". One working level is equal to approximately 200 picocuries per liter.

XYZ

Xenobiote: Any biotum displaced from its normal habitat; a chemical foreign to a biological system.

Yard Waste: The part of solid waste composed of grass clippings, leaves, twigs, branches, and garden refuse.

Yellow-Boy: Iron oxide flocculent (clumps of solids in waste or water); usually observed as orange-yellow deposits in surface streams with excess iron content. (See: floc, flocculation.)

Z-list: OSHA's tables of toxic and hazardous air contaminants.

Zone of Saturation: (See: saturated zone.)

Zooplankton: Tiny aquatic animals eaten by fish.

United States Marine Corps

Base Realignment and Closure Business Plan



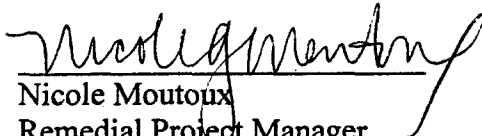
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Marine Corps Air Station
El Toro, CA

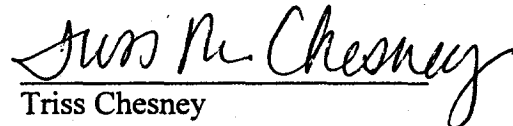
March 2001

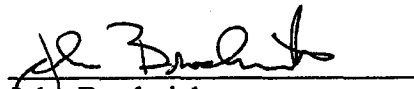
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EL TORO, CALIFORNIA

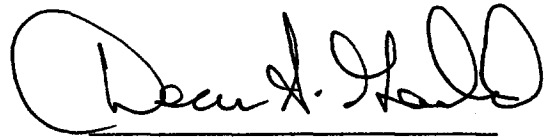
BASE REALIGNMENT AND CLOSURE
(BRAC) BUSINESS PLAN

This BRAC Business Plan provides current summary information on the status of and strategies for the cleanup of the Marine Corps Air Station, El Toro. We, the BRAC Cleanup Team, with consideration of community and stakeholder advice, have cooperatively developed this plan to provide for safe, effective, timely, and cost-efficient environmental restoration and productive reuse of the closed DoD facility. This plan will be updated periodically to reflect new information regarding the environmental condition of property, reuse priorities, and availability of funds.


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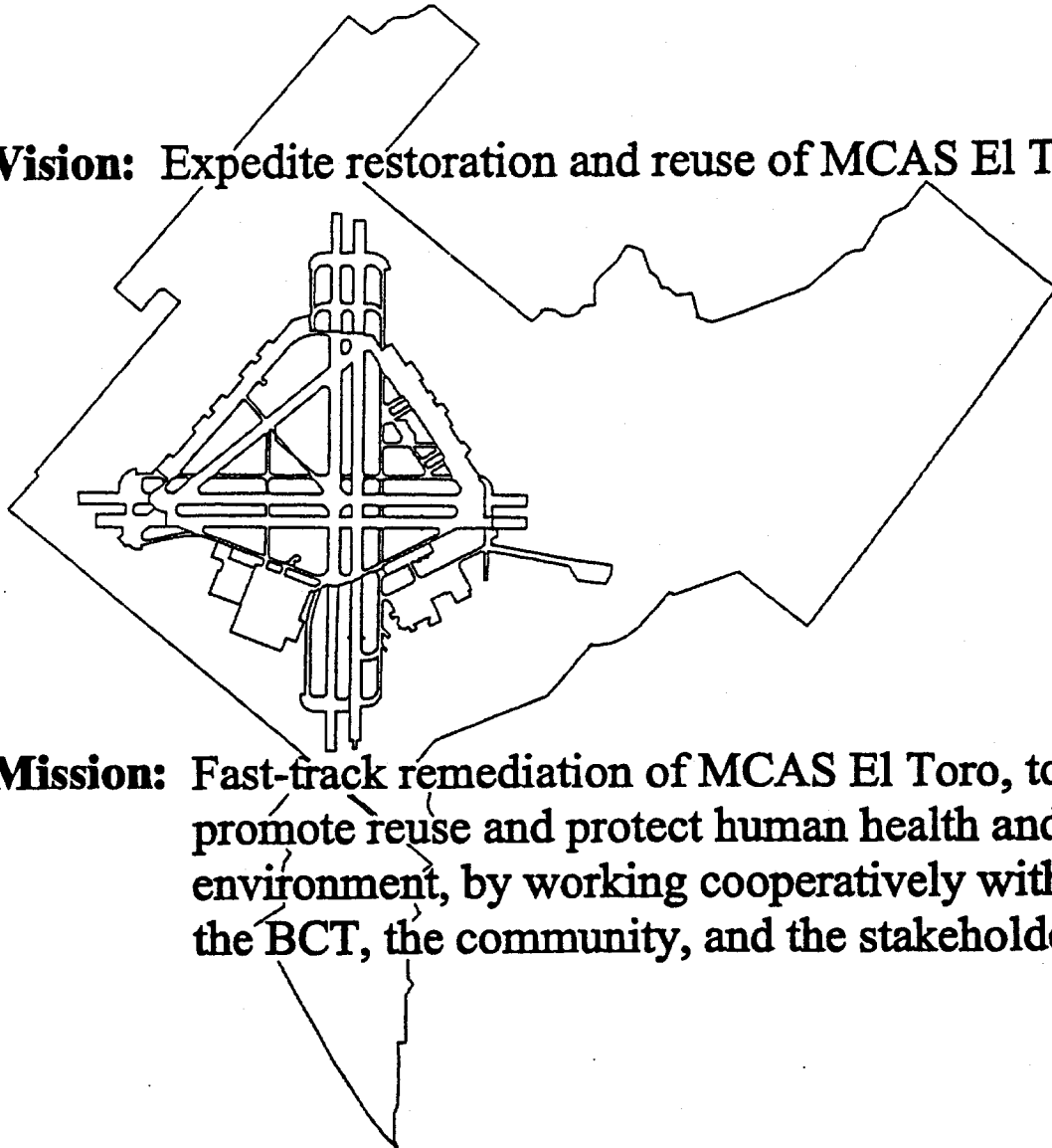

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Vision and Mission Statements

Vision: Expedite restoration and reuse of MCAS El Toro.



Mission: Fast-track remediation of MCAS El Toro, to promote reuse and protect human health and the environment, by working cooperatively with the BCT, the community, and the stakeholders.

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INTRODUCTION SECTION

NOTE: The Introduction Section serves as an “Executive Summary” of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.

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INTRODUCTION SECTION

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INTRODUCTION

The Department of the Navy (DoN) completed the realignment and closure of Marine Corps Air Station (MCAS) El Toro (Station) on 2 July 1999, in accordance with the Base Realignment and Closure Act (1993) (BRAC III). In 1993, the DoN organized a Base Realignment and Closure (BRAC) Cleanup Team (BCT) to manage and coordinate closure activities and to prepare an annual BRAC Cleanup Plan (BCP). The DoN published the initial BCP in 1994 and issued annual updates in 1995, 1996, 1997, 1998, and 1999. In 1999, the BCT agreed to publish a BRAC Business Plan (Business Plan) for the Year 2000 update. The DoN established the Business Plan, a ten to fifteen page document that is comparable to an extended executive summary, as an alternative to the BCP for installations with continuing environmental restoration programs. The Business Plan provides the status of, management and response strategies for, and action items related to the environmental restoration and compliance programs at MCAS El Toro. The Business Plan presents information available as of 31 December 2000, and describes the most significant environmental Locations of Concern, the acceleration initiatives implemented at MCAS El Toro, and BRAC projects under way. Exhibits, tables, and figures provide additional information pertaining to the environmental Locations of Concern.

The scope of the Business Plan considers the following regulatory mechanisms:

- BRAC III;
- National Environmental Policy Act (NEPA);
- Resource Conservation and Recovery Act (RCRA);
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act and the Community Environmental Response Facilitation Act (CERFA); and
- other applicable state and local laws.

MCAS El Toro was listed on the National Priorities List under CERCLA in February 1990, and the DoN, the United States Environmental Protection Agency, Region 9, the California Department of Health Services (part of which is now the California Department of Toxic Substances Control), and the California Regional Water Quality Control Board, Santa Ana Region entered into a Federal Facilities Agreement (FFA) which establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions. The Business Plan is a planning document; therefore, the information and assumptions presented may not have complete approval from the federal and state regulatory agencies. The Business Plan is a dynamic document that is updated regularly to reflect the current status of response actions and the changes in strategies or plans that affect the ultimate restoration and disposal of MCAS El Toro property. Comments from various sources, including major claimants, DoN activities, and federal and state regulatory agencies, were evaluated and considered for inclusion during the preparation of this Business Plan.

STATUS OF DISPOSAL, REUSE, AND INTERIM LEASE PROCESS

In March 1994, the County of Orange (County), along with the Cities of Irvine and Lake Forest, formed a joint powers authority to develop a reuse plan for MCAS El Toro. In January 1995, the County withdrew from the joint powers authority in response to the passage of Measure A, a countywide ballot initiative approved by Orange County voters in November 1994. Measure A anticipates that the principal feature of a County-adopted reuse plan for MCAS El Toro should be a commercial airport. Measure A also established the 13-member El Toro Airport Citizens Advisory Commission to advise the Board of Supervisors and Orange County Planning Commission on base reuse.

In April 1995, the Office of Economic Adjustment formally recognized the Orange County Board of Supervisors as the official Local Redevelopment Authority (LRA) for MCAS El Toro. As the recognized LRA, the Board of Supervisors was given sole responsibility for preparing a Community Reuse Plan (CRP) for submittal to the DoN. Eight Department of Defense (DoD) and federal agencies submitted formal applications for MCAS El Toro property during the federal screening process.

The LRA provided its recommendations on each of these requests to the Assistant Secretary of the Navy in early 1995. The LRA has endorsed requests by the Department of Interior (DOI) for the Habitat Reserve, the Federal Aviation Administration, and the California Air National Guard. The LRA recommended that the remaining requests be denied. No surplus property determination has been made. Currently, no transfer actions have been approved by the Assistant Secretary of the Navy.

In the March 1995 final Environmental Baseline Survey (EBS) Report (Jacobs Engineering Group, 1995), approximately 63 percent of the total 4,738 acres of real property at the Station was categorized as eligible under CERFA for transfer as uncontaminated property or Environmental Condition of Property (ECP) Type 1. ECP types are described in Exhibit 1.

Exhibit 1. Environmental Condition of Property (ECP) Types

ECP Type	Description
1	Areas where no release or disposal of hazardous substances or petroleum products (including migration) has occurred.
2	Areas where only release or disposal of petroleum products has occurred.
3	Areas of contamination below action levels.
4	Areas where all remedial action has been taken.
5	Areas of known contamination with removal and/or remedial action underway.
6	Areas of known contamination where required response actions have not been implemented.
7	Areas that are unevaluated or that require further evaluation.

Since the 1995 EBS, additional property has been categorized as area type 1. Property designated as area types 1 through 4 is environmentally suitable for transfer by deed. This property type now totals approximately 87 percent of the Station property. The remaining real property is identified as area types 5, 6, and 7. The real extent of land classified as area types 5,

6, and 7 is approximately 252 acres (5 percent), 323 acres (7 percent), and 3 acres (less than 1 percent), respectively.

In the fall of 1995, the LRA conducted the state/local and homeless provider screening process in accordance with the Base Closure Community Redevelopment and Homeless Assistance Act of 1994 and implementing regulations issued by the DoD and the U.S. Department of Housing and Urban Development (HUD) in August 1995.

The LRA prepared a final CRP and draft Environmental Impact Report (EIR), which evaluated three reuse alternatives for the Station. Reuse Alternative A - Commercial Passenger/Cargo Use (the proposed project) - provided for a full service commercial passenger and cargo airport and compatible non-aviation uses. Reuse Alternative B -Cargo/General Aviation Use - provided for a cargo and general aviation airport and compatible non-aviation uses. Reuse Alternative C - Non-aviation-provided for non-aviation uses including an educational campus, visitor-oriented attractions, research and development, and other uses.

In August 1996, the LRA issued the draft MCAS El Toro CRP, Homeless Assistance Submission (HAS) and draft EIR for a 67-day public review and comment period. The written public comment period ended on 15 October 1996. In the fall of 1996, the Orange County Airport Commission, the El Toro Airport Citizens Advisory Commission, and the Orange County Planning Commission conducted public meetings/hearings and adopted recommendations to the Board of Supervisors on the draft CRP, HAS and EIR.

On 11 December 1996, the Board of Supervisors adopted the final MCAS El Toro CRP (P&D Consultants Team, December 1996), which provides for a more detailed study of a full-service commercial passenger and cargo airport, as well as compatible non-aviation uses.

The final CRP also incorporates the LRA's previously transmitted recommendations on each of the DoD and federal agency requests for property at the base and the 47 Notice Of Interest applications submitted during the state/local and homeless provider screening process conducted by the LRA. The final CRP and HAS were submitted to the Assistant Secretary of the Navy and the Secretary of HUD on 13 December 1996.

The scheduling and prioritizing of parcels for reuse based on the final CRP was provided by the LRA in 1997. The closure programs summarized in this Business Plan are not anticipated to be adversely impacted by the LRA's parcel prioritization schedule.

The Bake Parkway/Interstate 5 public highway expansion project was completed and resulted in the transfer of approximately 25 acres of MCAS El Toro property in 1998.

In June 1999, Cooperative Agreement N68711-99-2-6504 for caretaker services to protect, secure, and maintain MCAS El Toro was executed with the County of Orange, extending through 31 August 2000. The expiration of the cooperative agreement for caretaker services was concurrent with the execution of a Master Lease, effective 31 August 2000.

DoN prepared a Finding of Suitability to Lease (FOSL) and entered into an interim lease with the County of Orange in July 1999 for post-closure use of the following areas: the Golf Course (approximately 225 acres); the Child Development Center (Buildings 656 and 873); the Officers' Club (Building 791); the Horse Stables (approximately 30 acres); the Recreational Vehicle (RV) Storage Area; the Indoor Training Pool (Building 839); and Building 83. The areas addressed in this lease were incorporated into the Master Lease that was executed on 31 August 2000. The Master Lease has a term of five (5) years beginning on 1 September 2000, and the terms and conditions of the Master Lease are identified in the *Interim Lease Between The United States of America and County of Orange, California For Property at Marine Corps Air Station, El Toro* dated 31 August 2000.

The County of Orange identified a detailed proposed reuse plan for MCAS El Toro in the Draft Environmental Impact Report (EIR 573) in December 1999, and the proposed future land uses are identified on Figure 2 of this Business Plan.

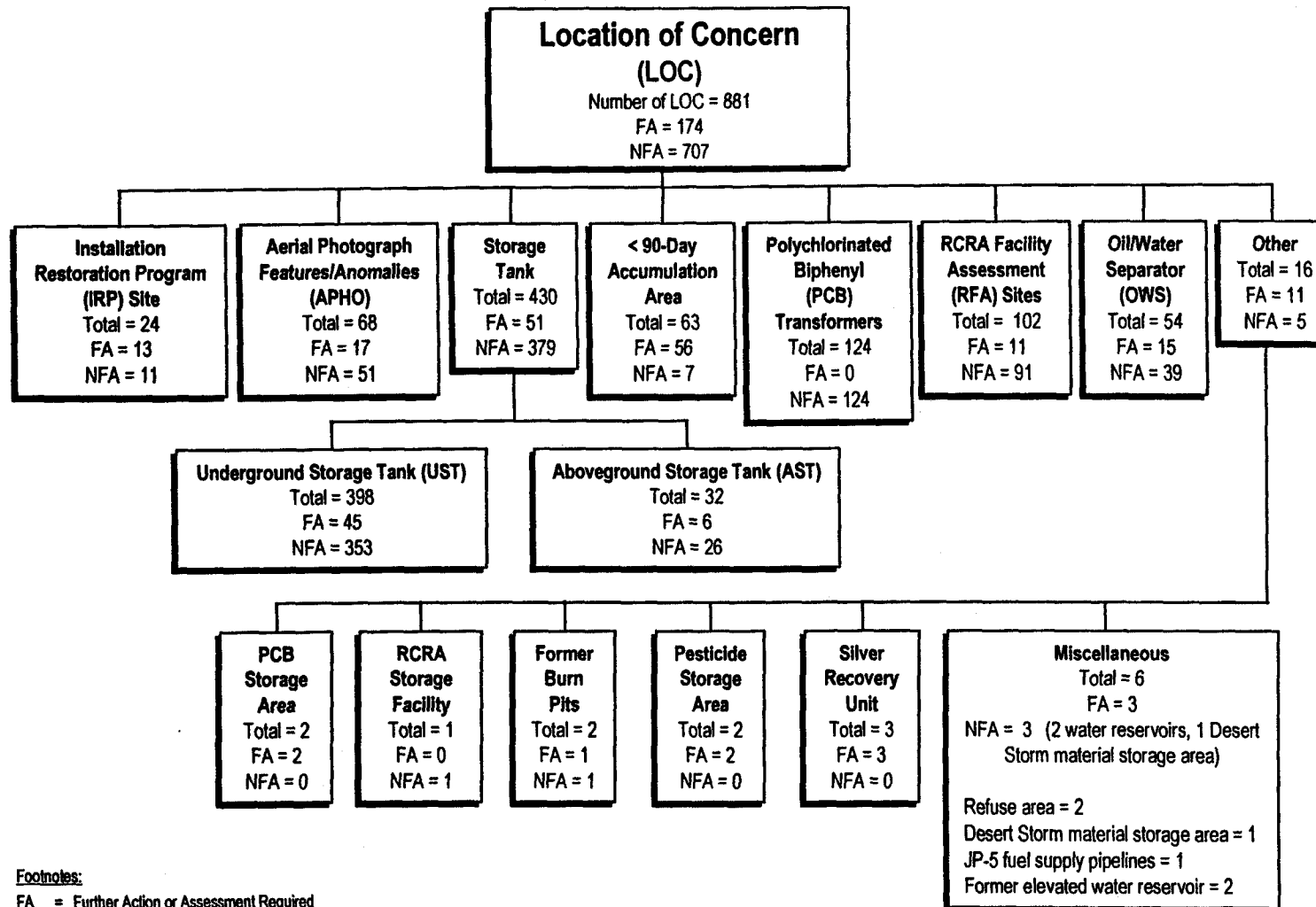
STATUS OF ENVIRONMENTAL RESTORATION PROGRAM

A total of 881 environmental Locations of Concern (LOCs), including twenty-four (24) Installation Restoration Program Sites (Sites), have been identified at MCAS El Toro. A LOC is defined as any identified location or area that is potentially contaminated or is a potential source of contamination. Several new LOCs were added to the program during 2000: Underground Storage Tank (UST) 324G, Above-ground Storage Tank (AST) 1, AST 730, AST 374A, AST 374B, AST 374C, AST 374D, and AST 374E.

Seven (7) LOCs were deleted from the program as phantom or non-existent LOCs. Record search activities, visual inspections, and cognizant regulatory agency concurrence were documented prior to deleting the LOCs from the program. Regulatory agency correspondence pertaining to the phantom LOCs has been placed in the Administrative Record. Deleted were the following LOCs: UST 473A, UST 374B, UST 5101, TAA 29A, TAA 29B, OWS 850, and OWS 851.

Exhibits 2, 3 and 4 summarize the types, numbers, and status of different LOCs at the Station.

**Exhibit 2 - Location of Concern Distribution
(as of 31 December 2000)**



Footnotes:

FA = Further Action or Assessment Required

NFA = No Further Action Required

Exhibit 3 – Distribution of 881 LOCs (as of 31 December 2000)

	IRP SITES	APHO SITES	STORAGE TANK SITES	<90-DAY ACCUMU- LATION AREAS (TAAs)	PCB TRANS- FORMERS	RFA SITES	OIL/WATER SEPARATOR SITES	OTHER
TOTAL	24	68	430	63	124	102	54	16
NFA	11	51	379	7	124	91	39	5
Further Action Required (includes LOCs with NFA Decision Documents in Review or In Development)	13	17	51	56	0	11	16	11

Exhibit 4 – New Sites Added during 2000 and Phantom Sites Deleted during 2000

Description	APHO SITES	UNDER- GROUND STORAGE TANKS	ABOVE- GROUND STORAGE TANKS	<90-DAY ACCUMU- LATION AREAS (TAAs)	RFA SITES	OIL/WATER SEPARATOR SITES
New Sites	0	1	7	0	0	0
Phantom Sites	0	3	0	2	0	2

Historical Environmental Program Highlights. The following accomplishments highlight the progress of environmental restoration activities at MCAS El Toro:

- Agency concurrence of a No Action Record of Decision (ROD) for eleven sites from OU-3 and OU-2A (Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and 25) in September 1997 and agency concurrence on the ROD for Site 11 in September 1999;
- Agency concurrence on the OU-2A interim ROD for the vadose zone at Site 24 in September 1997;
- Agency concurrence on the OU-2B interim ROD for Sites 2 and 17 in July 2000;
- Agency approval of the polynuclear aromatic hydrocarbon (PAH) Reference Study (prepared by Bechtel National Incorporated in 1996) that allowed the recategorization of 448 acres of land from area type 7 to area type 3, thus allowing this land to be transferable by deed; and
- Completion of two time-critical removal actions at Sites 2 and 17 and one non-time-critical removal action at Site 19.

Installation Restoration Program. Currently, a total of 24 sites are being investigated in the Installation Restoration Program (IRP) at the Station (Sites 1 through 22, 24, and 25). Of these, 22 sites were evaluated during the Phase I RI, which was completed in May 1993. Two additional sites were established for investigation in Phase II, bringing the total number of IRP sites to 24. These sites are grouped into three OUs: OU-1, OU-2, and OU-3. The following is a brief summary of the site groupings, current status, and FFA schedule for each of the three OUs.

- OU-1 addresses contaminated groundwater on- and off-Station and consists of one IRP site (**Site 18**). The final interim RI/FS report for OU-1 was submitted in August 1996. The Interim Draft Final Proposed Plan was submitted to the BCT in August 2000.
- OU-2 consists of three subunits (OU-2A, OU-2B, and OU-2C) and addresses potential source areas of groundwater contamination.
 - **OU-2A:** OU-2A includes Site 24 (the Volatile Organic Compound (VOC) Source Area) and Site 25 (the Major Drainages). **Site 24:** RI and Draft Phase II FS Reports for Site 24 were submitted in June and August 1996, respectively. Site 24 – the Volatile Organic Compound (VOC) Source Area – encompasses approximately 200 acres in the southwestern section of the Station. The planned reuse for Site 24 is cargo storage. The VOCs at Site 24 may have come from solvents containing trichloroethene (TCE) or perchloroethene (PCE) that were used at Site 24 until approximately 1975. Primary sources include degreaser tanks, storm drains and industrial waste sewers, and washracks. Pilot studies utilizing portable soil vapor extraction (SVE) treatment units were conducted during the period from approximately 1996 through 1998. The interim ROD (vadose zone only) for Site 24 was signed in September 1997, implementation of the final remedy – SVE treatment - commenced in 1999, and confirmation sampling of the vadose zone was completed in 2000. The ROD for OU-2A and OU-1, which will finalize the remedial decision and will address groundwater, is scheduled to be prepared in the year 2001. **Site 25:** The Draft Final ROD for no action was signed in 1997.
 - **OU-2B:** OU-2B addresses inactive landfill **Site 2** (Magazine Road Landfill) and **Site 17** (Communication Station Landfill). Sites 2 and 17 are located in the northeastern section of the Station in an area designated for future use as a habitat reserve. The former operational landfill units at Site 2 encompass approximately 27 acres, and the former operational landfill unit at Site 17 encompasses approximately 11 acres. Solid wastes from MCAS El Toro were disposed of at Sites 2 and 17. Suspected types of wastes include construction debris, municipal-type waste from Station operations, and oils and fuels. TCE and PCE have been detected in the groundwater at Site 2. The Draft Final Phase II RI and draft FS Reports were both submitted in September 1996. Draft Final FS reports were submitted in September 1997,

and a Draft Proposed Plan was submitted to the BCT in November 1997. The Draft Proposed Plan identified the preferred remedy for the former operational landfill areas at Sites 2 and 17 - a four-foot thick single-layer soil cover. The preferred alternative is based upon U. S. EPA's presumptive remedy approach to landfills. The Proposed Plan was provided for public review in May 1998. The Draft ROD was submitted in October 1998 to the BCT for review, and the Final Interim ROD was signed in July 2000. The Final ROD, a future document, will address management of the VOC plumes at Site 2.

- **OU-2C:** OU-2C addresses inactive landfill **Site 3 (Original Landfill)** and **Site 5 (Perimeter Road Landfill)**. Site 3 encompasses approximately 11 acres in the northeastern section of the Station. Site 5 encompasses approximately 1.8 acres in the southeastern section of the Station. Site 3 is designated for future reuse as a park, and Site 5 is designated for future reuse as a golf course. Reportedly, any waste generated on the Station could have been disposed of at these sites. The wastes are likely to have included municipal solid waste, fuels, and solvents. Site 3 included an incinerator, and incinerator ash was probably disposed of within the landfill. The Draft Final Phase II RI Reports were submitted in October 1996, and the Draft Final FS reports were submitted in September 1997. Based on BCT concurrence with the FS reports, a Draft Proposed Plan was submitted to the BCT in November 1997 and to the public in May 1998. The Proposed Plan identified the preferred remedy for the former operational landfill areas at Sites 3 and 5 - a four-foot thick single-layer soil cover. The preferred alternative is based upon U. S. EPA's presumptive remedy approach to landfills. Following the receipt of public comments, the preferred remedy was changed to a single-barrier cap with a two-foot foundation layer, a flexible membrane liner (FML), and a two-foot soil cover. The single-barrier cap design allows for future irrigation of the landfill cover. The Draft ROD was completed in March 1999, and the Draft Final ROD is expected to be completed in the year 2001.
- **OU-3** addresses the remaining sites and information pertaining to the suspected types of wastes at each OU-3 site is presented in Tables 2 and 3. Portions of three sites (**Sites 15, 19, and 20**) are no longer part of the IRP; they have been withdrawn via the CERCLA petroleum exclusion and are managed with state or local environmental program oversight. **Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, and 22** were addressed in the ROD for no action sites in 1997. **Site 1** is in the remedial investigation/feasibility study phase, and a draft Work Plan for the Phase II Remedial Investigation was completed in September 2000. A Proposed Plan recommending no action as the final remedy was issued for **Sites 7 and 14 (Operable Unit 3B)** in September 2000, a Public Meeting was held in October 2000, and the Draft ROD was completed in November 2000. A Draft Final ROD for **Sites 8 and 12** is in development. **Site 11** is in the remedial design/remedial action phase. A pilot study for multi-phase extraction was initiated at **Site 16** in October 2000,

and the results of the pilot study will be incorporated into the Draft Final Feasibility Study for Site 16.

RCRA Facility Assessment Sites. A RCRA Facility Assessment (RFA) was performed at the Station between 1990 and 1993. The RFA included the investigation of 305 solid waste management units (SWMUs)/areas of concern (AOCs). However, 3 units were located at MCAS Tustin, 15 units were duplicates of other SWMUs/AOCs, and 4 SWMUs/AOCs were researched and identified as phantom sites. Of the remaining 283 SWMUs/AOCs, 140 were included in a sampling effort. The RFA report was approved by DTSC contingent upon performance of additional investigation at 14 SWMUs/AOCs. A final addendum to the RFA report was completed on 31 May 1996. The addendum presents results and recommendations for the 14 SWMUs/AOCs and recommends closure strategies for 73 temporary accumulation areas. The status of SWMUs/AOCs, as presented in the RFA documentation, is summarized as follows:

- 8 addressed in the IRP;
- 1 addressed in the PCB category of LOCs;
- 76 addressed as USTs;
- 30 addressed as OWSs;
- 66 addressed as Temporary Accumulation Areas (TAAs); and
- 102 addressed as RFA sites, of which 14 required further action or assessment.

The number of SWMUs/AOCs (283) is greater than the number of RFA sites indicated in Exhibit 2, because some LOCs have been designated as both SWMUs/AOCs and as other types of LOCs. For example, there are USTs that have been identified as SWMUs/AOCs and there are TAAs that have been identified as SWMUs/AOCs. Exhibit 2 refers to these SWMUs/AOCs as USTs or TAAs instead of as RFA sites.

Compliance Program Sites and Other LOCs. There are several compliance programs in progress at MCAS El Toro that involve different types of LOCs including USTs, less-than-90-day accumulation areas, polychlorinated biphenyl (PCB)-containing transformers, and oil/water separators. The status of each of these types of LOCs is summarized as follows:

Status of USTs (Total: 398 sites):

- 353 No Further Action sites (88%);
- 45 sites with work in progress (11%).

Status of ASTs (Total: 32 sites):

- 26 No Further Action sites (81%);
- 6 sites with work in progress (19%).

Status of Aerial Photograph Anomaly (APHO) Sites (Total: 68 sites):

- 51 No Further Action sites (75%);
- 17 sites with work in progress (25%).

Status of Less-Than-90-Day Accumulation Areas and Resource Conservation and Recovery Act Facility Assessment (RFA) Solid Waste Management Units (165):

- 98 No Further Action sites (59%);
- 67 sites with work in progress (41%).

Status of PCB-Containing Transformers: 124 No Further Action sites (100%).

Status of Oil/Water Separators (Total: 54 sites):

- 39 No Further Action sites (72%); and
- 15 sites with work in progress (28%).

The status of the remaining types of LOCs (PCB storage sites, burn pits, silver recovery units, JP-5 pipeline, pesticide storage sites, and other sites) is shown on Exhibit 2. Business Plan updates will continue to summarize both the number and status of all LOCs at MCAS El Toro.

INITIATIVES FOR ACCELERATING CLEANUP

The BCT conducted a "bottom up" review of the environmental programs at MCAS El Toro in accordance with DoD guidance on establishing BCTs (DoD 1993). During the review process, the following nine issues were addressed to identify opportunities for accelerating cleanup activities necessary to facilitate conveyance of real property at the Station.

1. **Technology Review.** Publications such as Treatment Technologies Applications Matrix for Base Closure Activities, prepared by the California Base Closure Environmental Committee, dated November 1994 (CBCEC 1994a) and the latest information from the United States and California Environmental Protection Agencies (U.S. EPA and Cal-EPA) and DoD will be reviewed as part of the evaluations performed in selecting technologies.
2. **Removal Actions.** A UST Tiger Team addressed compliance and closure issues related to USTs on-Station during the 1995-1997 time period, and the Tiger Team worked to identify USTs that could be taken out of service without adversely impacting Station operations. All tanks within the former Tank Farms 1, 2, 3, 4, 5, and 6 have been removed, and most of the tank sites have been closed by the regulatory oversight agencies. Soil vapor extraction (SVE) technology was utilized to remediate the vadose zone at Tank Farm 2, and the vadose zone release was closed by the Regional Water Quality Control Board, Santa Ana Region in March 2000. SVE systems were utilized to remediate vadose zone releases of petroleum hydrocarbons at Former UST Sites 651-1, 651-2, 651-3, and 651-4 (UST Group 651) and at Former UST Site 364A during 2000, and a bioventing pilot test was initiated at Tank Farm 555 during 2000.

Two time-critical removal action memoranda were submitted for public review in

October 1996 for IRP Sites 2 and 17 (former landfills), for public safety and to abate erosion of landfill materials. The removal actions were completed in 1997. A non-time-critical action memorandum was also submitted for public review in October 1996 for IRP Site 19 (Unit 2). These removal actions were designed to reduce the risk to human health and the environment and to expedite cost-effective cleanup.

A pilot study utilizing multi-phase extraction for remediation of a combined petroleum hydrocarbon and chlorinated solvent release was initiated at Site 16 during October 2000.

3. **Clean Properties.** A basewide EBS for MCAS El Toro was submitted to the United States Environmental Protection Agency (U.S. EPA) and California Environmental Protection Agency (Cal-EPA) on 1 April 1995. The Navy, Marine Corps, and regulators have concurred on the designation of area type 1 parcels as Environmental Condition of Property, Category 1. The EBS designated approximately 3,088 acres of land as Environmental Condition of Property, Category 1. Review of information available since April 1995 indicates that approximately 3,175 acres of land are currently Environmental Condition of Property, Category 1. The BCT and the LRA will work together to determine how to transfer properties expeditiously.
4. **Overlapping Phases.** As an ongoing effort, the BCT will continue to identify phases of the cleanup process that can be overlapped to reduce the time required for completion. Areas of overlap at MCAS El Toro include the following:
 - the RFA was conducted concurrently with the Phase I RI during the period from 1991 through 1994;
 - Phase II RI/FS activities for the volatile organic compound (VOC) source area, landfills, and OU-3 sites were conducted simultaneously during the period from approximately 1995 through 1997;
 - Integration of Comprehensive Long-Term Environmental Action Navy (CLEAN)/Remedial Action (RAC) and other contractors to facilitate the design and implementation of field work has occurred and continues to occur during the remediation of the vadose zone and groundwater at Site 24; and
 - Planning for additional demonstration projects for groundwater remediation at Site 24 and other sites to facilitate site remediation during the development of the Records of Decision.
5. **Contracting Procedures.** SWDIV management of the CLEAN, RAC, and indefinite-quantity contracts has been based on a cooperative and interactive approach, and the following contractors have participated in environmental restoration and/or compliance program projects during 2000: ARINC; Bechtel National, Incorporated; CDM Federal Programs Corporation; Earth Tech; Foster

Wheeler; Geofon; Law-Crandall; The IT Group; and Roy F. Weston. Active participation by the Project Team results in a bias for action.

6. **Community Reuse Interface.** In an effort to carry out strategies for environmental restoration activities, while assuring proactive community involvement, the Station has adopted an approach to meet the needs of the public as well as the requirements of NEPA, CERCLA, CERFA, and the California Health and Safety Code Section 25356.1. The approach provides for a number of services to inform interested parties (e.g., the city of Irvine, the city of Lake Forest, and the County of Orange) of environmental restoration activities while maintaining a commitment for efficient and cost-effective cleanup at MCAS El Toro.
7. **Bias for Cleanup.** The BCT will continue to emphasize expedited remedial actions and attempt to avoid lengthy site characterization studies and prolonged RI/FS activities. As such, the BCT members will continue to collaborate in devising work plans, identifying cleanup criteria, and selecting remedial actions in an effort to aggressively pursue cleanup instead of studies and data collection. Acceleration of ongoing or future cleanup activities will continue to be in strict compliance with applicable rules, regulations, and public health and safety requirements. Remediation strategies and plans for cleanup activities have been shared with representatives from the known or anticipated reuse organizations including technical, operational, reuse, and administrative specialists.
8. **Presumptive Remedies.** Presumptive remedies are preferred technologies for common categories of sites, based on previous remedy selection and U.S. EPA scientific and engineering evaluation of performance data on technology implementation. The presumptive remedy approach is one tool used to accelerate cleanup under the Superfund Accelerated Cleanup Model. Presumptive remedies are expected to assure consistency in remedy selection and reduce time and cost required to clean up similar types of sites. Currently, presumptive remedies are recognized by U.S. EPA for VOC remedies and municipal and military landfill remedies. Presumptive remedies have been selected for the four landfill sites (Sites 2, 3, 5, and 17) and the VOC source area (Site 24).
9. **Partnering.** A partnering agreement among the Project Team is essential for efficient management of the base closure process. The following team charter agreement for MCAS El Toro was developed during a team-building seminar held in October 1994.

"We, the MCAS El Toro partners, commit to effectively working together to maximize restoration and reuse of MCAS El Toro by 1999. We will accomplish this goal through teamwork, dedicated and focused participation, our ethics outlined below, and effective communication between all partners.

We want the project to be enjoyable to work on and will work together with trust and respect, and will ensure that all team members' interests impact decisions. Problems will be resolved quickly or escalated if appropriate by team members closest to the issue. As partners, we commit to communicating our mission and partnership goals to new project members and encourage them to embrace this partnership.

Our mutually agreed upon ethical standards are listed below.

CODE OF ETHICS

Integrity	Objectivity	Trust	Dependability
Leadership	Accountability	Sincerity	Credibility
Empathy	Candor	Responsibility	Honesty

Additionally, we will listen to and value others' opinions, honor diversity, model the behavior we expect from others, and have fun."

Through meetings and conference calls, the BCT has worked together as a team to discuss and resolve issues related to environmental restoration activities at MCAS El Toro with a focus on expediting reuse while protecting human health and the environment.

SUMMARY OF CURRENT AND PLANNED BCT ACTION ITEMS

The BCT has coordinated and managed a number of tasks relating to the BRAC cleanup activities at MCAS El Toro during the past year. A brief list of accomplishments for 2000 includes:

Environmental Program Highlights for 2000.

- Conducted six (6) Restoration Advisory Board (RAB) meetings addressing a vast array of issues of public interest and one public meeting for Sites 7 and 14 during 2000;
- Continued progress on an agreement between Orange County and Irvine Ranch Water Districts and the United States (represented by the Department of Justice (DOJ)) in support of a multipurpose project to remediate regional groundwater contaminated with volatile organic compounds;
- Conducted CERCLA groundwater monitoring activities and investigated perchlorates and radionuclides in groundwater;
- Signed the draft Final Interim ROD for Sites 2 and 17;
- Completed Final Historical Radiological Assessment (HRA) and the Draft Final Survey Plan for the Radiological Survey;
- Completed the vadose zone confirmation sampling activities at Site 24;
- Commenced operation of Soil Vapor Extraction (SVE) treatment systems at UST Group 651 and former UST Site 364A;
- Constructed bioventing well and monitoring points for pilot test and began pilot test at Tank Farm 555;

- Achieved regulatory closure of 38 USTs (353 USTs to date) and removed 19 inactive USTs during calendar year 2000;
- Conducted removal of inactive OWSs and ASTs and conducted cleaning, testing, and closure of primary JP-5 pipelines; and
- Conducted site verification sampling activities at UST sites, AST sites, OWS sites, and aerial photograph anomaly (APHO) sites, and completed closure documentation for more than 50 LOCs.

Planned Goals for Year 2001:

- Sign the agreement between Orange County and Irvine Ranch Water District and the DOJ in support of a multipurpose project to remediate regional groundwater contaminated with volatile organic compounds;
- Issue the Proposed Plan for Sites 18 and 24 for public comment;
- Issue the Draft ROD for Sites 18 and 24 for public comment;
- Issue the Proposed Plan for Site 16 for public comment;
- Issue the Draft ROD for Site 16 for public comment;
- Complete Draft Final RODs for Sites 3 and 5;
- Conduct radiological surveys;
- Initiate soil sampling activities for lead-based paint at the housing areas;
- Continue coordination with United States Fish and Wildlife Service, the LRA, and the BCT during the design of landfill covers for Sites 2 and 17;
- Procure services for the design of landfill covers for Sites 3 and 5;
- Continue groundwater monitoring activities and evaluation of groundwater data; and
- Conduct the site verification and/or remediation activities at UST, OWS, AST, fuel pipeline, and APHO sites.

Table 1 provides a list of recommendations and issues associated with the environmental restoration and compliance programs that require further evaluation and action by the BCT. The list covers key items identified during the course of the Business Plan preparation and includes the BCT activities relating to the base closure.

Tables 2 and 3 identify the status of each LOC as of 31 December 2000, and Table 4 identifies the buildings with known asbestos. The current reuse parcel identifier, for the Concept B Reuse Plan of 1999, is included for each LOC in Tables 2 and 3. Figures 1, 2, and 3 show the vicinity of the Station and information pertaining to the most current reuse plan (preferred land use plan (Concept B)). Figures 4 through 12 show each type of LOC, Figures 13 and 14 show the environmental condition of property, and Figure 15 shows the IRP Site boundaries with the preferred land use plan, and Figure 16 shows the radiological survey sites.

SCHEDULE/CRITICAL MILESTONES

The Installation Restoration Program milestones are identified in the Federal Facilities Agreement (FFA) for the Marine Corps Air Station, El Toro. The FFA schedule is usually revised or updated three or more times per year.

Critical milestones for the environmental restoration program are presented in Table 5. Historical information pertaining to the expenditures for each Installation Restoration Program Site and cost to complete estimates are presented in Table 6.

INTRODUCTION SECTION

NOTE: The Introduction Section serves as an "Executive Summary" of the complete document. To look at tables, figures and attachments referenced in the Introduction, please consult the complete document. It is available at two locations: (1) the Administrative Record File, located at MCAS El Toro, Base Realignment and Closure Office, Building 368 – contact Ms. Charly Wiemart at (949) 726-2840 to arrange an appointment; (2) the MCAS El Toro Information Repository located at the Heritage Park Regional Library, 14361 Yale Avenue, Irvine, phone number (949) 551-7151.

Marine Corps Air Station, El Toro

Location of Concern (LOC) Status Table

(Updated 7 November 2001)

STATUS	USTs	ASTs	OWSs	APHOs	SWMU/ TAAs	MSC	PCB XFRMRS	IRP Sites
TOTAL (886)	399	35	54	68	166	16	124	24
NFA (725)	355	30	40	51	105**	7	124	13
% Complete (80)	89	86	74	75	61	30	100	54
In Regulatory Review (73)	27	4	7	114	20	1	0	0
In Progress (88)	17	1	7	3	41	8	0	11
NFA for FY 2001 (27)	4	9	1	7	2	2	0	2
Former IRP Sites 6 Total 4 NFA								

** includes SWMUs with NFA determinations pending results of radiological survey.

Explanation:

NFA: No Further Action

UST: Underground Storage Tank

AST: Aboveground Storage Tank

OWS: Oil/Water Separator

APHO: Aerial Photograph Anomaly

SWMU: Solid Waste Management Unit

TAA: Temporary Accumulation Area

MSC: Miscellaneous Location of Concern

MARINE CORPS AIR STATION EL TORO

RESTORATION ADVISORY BOARD MEETING

January 31, 2001 – 49th Meeting

MEETING MINUTES - EXCERPT

Rifilato, of ITPS, the contractor representing the Defense Energy Support Center, formerly Defense Fuels Supply, can be reached at (562) 921-2271.

◆ Update on Norwalk Pipeline – Dean Gould, BEC MCAS El Toro, and John Rifilato, Defense Fuels Representative

Mr. Gould said that at the last RAB meeting, based on the information that he had on the Norwalk Pipeline, he answered as many questions as he could. Mr. Rifilato of ITPS, a contractor representing Defense Energy Support Center (DESC), formerly called Defense Fuels Supply, is going to describe technical details of the pipeline in which the RAB has shown interest. Mr. Gould said that Mr. Rifilato has attended previous RAB meetings and has been working to support the Norwalk pipeline for 10 years.

Mr. Rifilato said that the pipeline was built in 1955 or 1956 to support the air operations of MCAS El Toro. It is an 8" pipeline that runs from Norwalk to MCAS El Toro that comes onto the base near the commissary located by Irvine Boulevard. It runs along Irvine Boulevard and where the road turns it crosses beneath the road and runs right in front of the off-base commissary and through the middle of base housing to the tank farm. He said that the tanks near the pig launcher are associated with the pipeline but these tanks have always been the responsibility of Station personnel. Aviation fuel was pumped through the pipeline until approximately 1975, and since then JP-5 began was transported through the pipeline. The Navy operated and maintained the pipeline until approximately 1980, and then turned it over to the DESC, a division of the Defense Logistics Agency (DLA), which supplies all the fuel to all the bases.

Mr. Rifilato said in 1988 a loss of pressure in the pipeline was detected. It was tracked down to three pinhole leaks that were consistent with backhoe damage from a previous dig site at the intersection of Old Irvine and Newport Boulevards. He said when the Norwalk pipeline was exposed another pipeline was found just underneath it. The California State Fire Marshal and the Federal Office of Pipeline Safety were alerted and assisted in the investigation of the deeper pipeline to determine whom it belonged to. Nobody responded to the inquiry on that pipeline. Based on the wear on the line, it was estimated that that pipeline underneath the Norwalk pipeline was installed around 1975. Mr. Rifilato reiterated that this has been the only leak and this pipeline is as tight as ever and is in excellent shape.

Mr. Rifilato explained that if the Norwalk pipeline is nicked, this could cause a breakdown of part of the pipeline system. This system is comprised of a coating on the outside of the pipe to protect the metal from alkali in the soil that can corrode metal. Also, fuel that runs through the line creates a static electric charge so a grounding mechanism is installed. At the location

where the grounding mechanism is installed there is a pitting point. He reiterated that just nicking the coating on the pipeline could cause a system breakdown. The pipeline is also comprised of a cathodic protection system that inserts a direct current (DC) charge into the line. It also shoots a charge into the ground that creates a coat between the pipeline and the soils.

Mr. Rifilato said the pipeline is in excellent shape. Over the years numerous relocations of this pipeline have been done. He said that the pipeline used to run straight down Irvine Boulevard, but with Jamoboree Road, the Highway 133 tie-in, and the Highway 261 tie-in, a 1,000-foot relocation was completed in 1995. The pipeline was lowered some 60 feet so that it was at a safe operating distance from the freeway corridor. The pipeline was also inserted into a protective casing.

Mr. Rifilato said that with a relocation, the line is blinded, drained down and cold cut. The new pipe is then installed and welded, and the pipe is put in place in a few hours so the line is only down for about two days. He said that with the expansion of the I-5 Freeway there will probably be three relocations of the pipeline this year. He said that in many areas the pipeline is new. Whenever that pipeline is dug out, pipeline crews are obligated under United States Code of Federal Regulation (CFR 49.195) to inspect the condition of the line.

He said that pipeline maintenance is ongoing. On a daily basis a line rider "rides" the pipeline, and responds to over 300 underground service alerts per month. Every dig near the Norwalk pipeline is observed. At anytime it is determined that the pipeline coating is bad or that the line has been nicked, it can be repaired right there and any problems that might arise are fixed.

Mr. Rifilato said that the pipeline was hydrotested in 1993, which involved pressure testing the entire pipeline (29.3 miles) at both ends and blocking off the entire line. There were no leaks at anytime during this test. He said that if there was a variance in pressure over the 29.3 miles, this would be taken into consideration per the State Fire Marshal regulations and monitored by an outside third-party contractor. If anything were to have failed they would have shut down the hydrotest to inspect the line but no problems were encountered. He also said that the pipeline was tested at 125% of normal operating pressure and there were no leaks. At no point would the line ever get up to this pressure during normal operations.

Mr. Rifilato said that in May 1999 all the fuel was removed using a pigging process, and now nitrogen is the only substance present in the line from Norwalk to MCAS El Toro. The pressure at in the line after the pigging process was 55 pounds per square inch (psi) but it is currently 25 psi because the packing around a valve has dried up due to the pipeline being filled with nitrogen. The packing material on this valve is not compatible with nitrogen. He said that within the next 3 or 4 months that valve will be replaced. This valve never leaked when fuel was in the pipeline and it is aboveground so if it had it would have been easy to detect a leak.

Whenever an area is dug up around the Norwalk pipeline it is checked for fuel remnants. If any fuel remnants are encountered it is fully investigated. No fuel remnants have ever been found at any digs associated with the Norwalk pipeline. Mr. Gould asked how the line is tested for leakage. Mr. Rifilato said the nitrogen-filled pipeline is monitored and charted

daily. He said line logs are maintained and leak detection is covered in those logs. It is important to do this monitoring because one other problem that can be encountered with a pipeline is oxidation. It is very important to prevent any oxygen from getting into the pipeline because it could cause the pipeline to rust. He said that right now oxidation is the only concern in maintaining the pressure in the pipeline. Currently, only nitrogen is present in the pipeline.

Ms. Reavis said that this is a 45-year old, 29.3-mile pipeline that only supplied fuel to MCAS El Toro, so why is money is being invested in maintaining the pipeline for a base that is closed? She asked what federal agency is deciding to spend tax dollars to take care of this monstrosity. Mr. Rifilato replied that pipeline maintenance is part of a contract that is already in place, so until the disposal process of this pipeline is conducted, DESC is responsible for maintaining the pipeline and responding to digs near the pipeline as long as it is in the ground. He said that the DESC cannot just leave the pipeline in the ground and walk away. The government has to respond to anyone conducting digs near the pipeline. He added that it would be up to pipeline engineers to determine if the Norwalk pipeline can provide a use in the future. Mr. Gould said that the primary concern of the RAB regarding this pipeline is potential fuel leaks onto the base. He said that future use or reuse of the pipeline is not a RAB concern, and is appropriately addressed in a different forum.

Ms. Reavis asked with maximum pressure on the line, how many gallons of fuel per year were flowing to the base? Mr. Rifilato said that approximately 52 million gallons of fuel was transported to the base per year with shipments twice a week. Mr. Werner asked at the maximum pressure of 350 gsi, what is the potential capacity flow rate? Mr. Rifilato replied that the brochure provided to the RAB in the past says that the flow rate is 400 barrels per hour, but the actual potential capacity flow rate is 720 barrels per hour. Mr. Ouellette asked in regards to the pipeline being blocked off, where is the last block located? Mr. Rifilato replied that it is blocked off at the Triple Nickel Tank Farms just past the administrative building where two valves are located at the pig launcher/retriever. Mr. Ouellette asked, at what exact location does DESC responsibility end and the Navy's begin? Mr. Rifilato said that DESC's responsibility ends right at the two valves that are located at the Triple Nickle Tank Farms. The line rider checks that facility almost everyday.

Mr. Rifilato was asked if the inert nitrogen gas in the pipeline is part of the overall remediation strategy for the Norwalk pipeline or is it associated with the leak that did occur? Mr. Rifilato said that there is ongoing remediation for the one leak the pipeline had, and it involves approximately 75 wells in the area around the pipeline. Every other week product is being pulled out of those wells and presently bi-annual sampling is conducted in the area located around the pipeline area. Because this is such a high profile area and there is resistance from property owners, they cannot perform a typical pump and treat operation. Mr. Rifilato reiterated that there is no other remediation other than for this leak.

Mr. Zweifel asked, what is the maximum volume that could be sent down the pipeline to the end user per year? Mr. Rifilato said that it can take roughly 720 barrels per hour, multiply that by 24 hours, multiply that by 365 days, and multiply that by 42 gallons per barrel. This equates to roughly 264,902,400 gallons per year.



Proposed Plan — Groundwater Cleanup for Operable Units 1 and 2A at Marine Corps Air Station El Toro

November 2001

Marines Propose Joint Treatment Facility for Groundwater Plume Cleanup

The Marine Corps is requesting comments from the public on alternatives for cleanup (remediation) of contaminated **groundwater** at Installation Restoration Program **Operable Unit** (OU) 1 Site 18, the Regional Groundwater **Plume** and OU-2A Site 24, the **Volatile Organic Compound** (VOC) Source Area, at Marine Corps Air Station (MCAS) El Toro (see figure on page 2 and map on page 5). This Proposed Plan summarizes and proposes a final remedy for groundwater at OU-1 and OU-2A.

Soil cleanup at Site 24 was addressed previously in an Interim **Record of Decision** (ROD) signed in September 1997. The remedy for soil has been implemented and closure documentation for cleanup of soil was submitted for regulatory review in June 2001. A separate Final ROD for soil will be developed in 2002.

For more
information on
the Public
Comment
Period and
Public Meeting,
see page 2.

This Proposed Plan notifies the public of opportunities to comment on several alternatives and presents the Marine Corps' preferred remedy that addresses groundwater at Sites 18 and 24 and protects both public health and the environment. This Plan provides an overview of environmental investi-

gation results, and summarizes the cleanup alternatives that underwent detailed evaluation. More detailed descriptions of the

remedial investigation and cleanup alternatives are presented in the Draft Final Remedial Investigation Reports and the Draft Final Feasibility Study Reports, respectively. These reports are available for public review at the Heritage Park Regional Library in Irvine, and are part of the MCAS El Toro Installation Restoration Program Administrative Record file (see page 22).

Remedial investigations concluded that VOCs, primarily the industrial solvent **trichloroethene** (TCE), are present in groundwater at Site 18 and in soil and groundwater at Site 24. VOCs in the soil at Site 24 have migrated into the **shallow groundwater unit** beneath the site and then into the regional groundwater (**principal aquifer**). TCE is present in a groundwater plume that extends about 3 miles west of the Station to Culver Drive in Irvine. This groundwater is currently not used as a drinking water source. The source of contamination is TCE and other solvents that were believed to have been used for degreasing parts, paint stripping, and other maintenance activities performed within the Site 24 boundary to support the Station's mission as an aviation center. Usage of TCE at the Station was discontinued in about 1975.

The Marine Corps' remedial action objectives for the shallow groundwater unit and the principal aquifer are to: reduce concentrations of VOCs in groundwater to the more stringent of federal or state **water quality standards**; control VOC migration; and prevent **domestic use** of groundwater containing VOCs above **cleanup goals** until cleanup is achieved.

The preferred remedy, Alternatives 8A and 10B' combined, is to extract contaminated groundwater and treat it to remove VOCs until it complies with cleanup goals and water quality standards of the federal **Comprehensive Environmental Response, Compensation, and Liability Act** (CERCLA) (see page 16). VOC treatment to meet CERCLA standards would be conducted at a VOC treatment plant constructed at the planned Irvine Desalter Project (IDP) treatment plant. Groundwater will also be treated at the IDP

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Definitions of Technical Terms

To assist readers in understanding technical terms, a glossary is included in the Proposed Plan. The first time a technical term is presented it appears in **bold/italic** typeface. Refer to the glossary on page 23 for definitions.

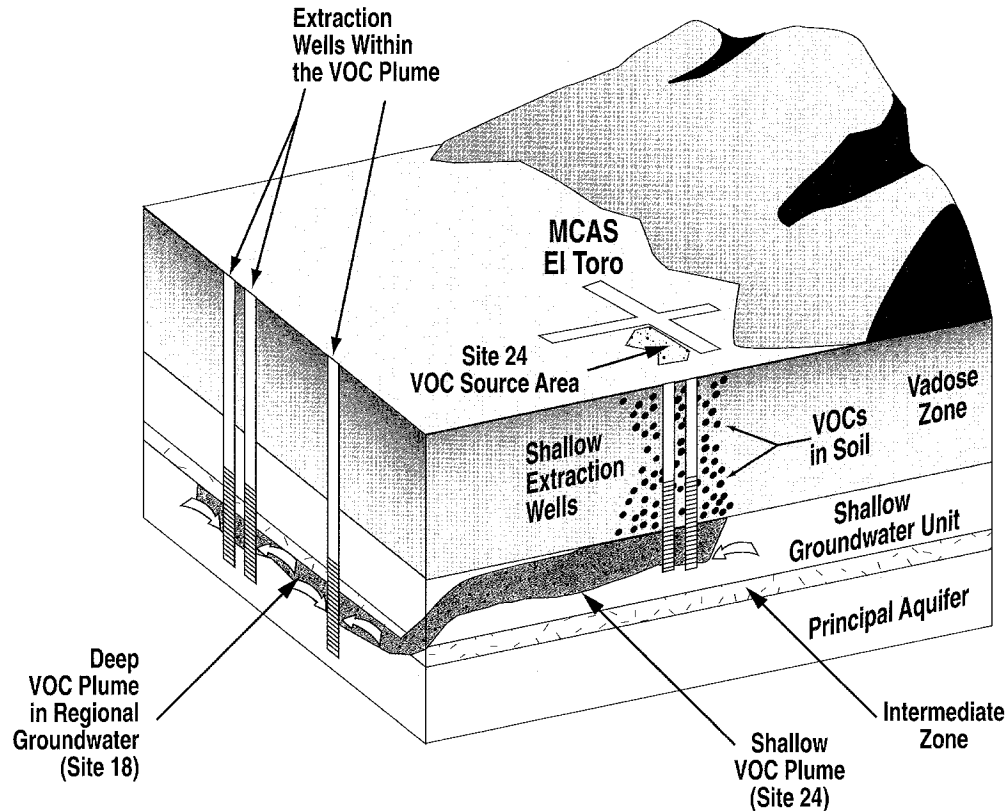
► CONTINUED FROM PAGE 1

by the Irvine Ranch Water District to remove *total dissolved solids* (TDS) and *nitrates* in a non-CERCLA treatment program so the water is suitable for recycled water purposes such as irrigation and industrial use (see page 3). Elevated levels of TDS and nitrates resulted from natural conditions and regional agricultural practices rather than MCAS El Toro operations. Treatment to remove TDS and nitrates is not the Marine Corps' responsibility. The Interim ROD for Site 24 selected *soil vapor extraction* (SVE) for remedi-

ation of VOCs in soil (see page 15). This Proposed Plan provide an update on the progress of SVE remediation at Site 24.

A final remedy for groundwater will be selected after the public comment period has concluded and all comments have been reviewed and considered. The selection of the final remedy for groundwater cleanup at Sites 18 and 24 will be documented in the ROD (see page 20). A separate Final ROD will document final soil cleanup at Site 24.

Figure 1—Underground View of the VOC Plume



Opportunities for Public Involvement

Public Meeting — Tuesday, November 13, 2001 6:00-9:00 p.m.

Irvine Ranch Water District, Multipurpose Conference Room, 15600 Sand Canyon Avenue, Irvine

You are invited to attend a public meeting to discuss the information presented in this Proposed Plan regarding the groundwater cleanup at Installation Restoration Program Operable Unit 1 Site 18 and at Operable Unit 2A Site 24 at MCAS El Toro. Marine Corps representatives will provide visual displays and information on the environmental investigations and the cleanup alternatives evaluated. You will have the opportunity to ask questions and formally comment on the alternatives. (Agenda: 6:00-7:00 Open House/Information Displays, 7:00-8:00 Formal Presentation/Question Session, 8:00-9:00 Public Comments/Oral and Written.)

Public Comment Period — November 7-December 7, 2001

We encourage you to comment on this Proposed Plan and site-related documents during the 30-day public comment period. You may submit written comments by mail **postmarked no later than December 7, 2001** to: Mr. Dean Gould, Base Realignment and Closure (BRAC) Environmental Coordinator, Environmental Division, MCAS El Toro, P.O. Box 51718, Irvine, CA 92619-1718. Comments may also be sent to Mr. Gould by fax to (949) 726-6586, or via e-mail at GouldDA@efdswnavfac.navy.mil no later than December 7, 2001. Public comments received during this period, or in person at the public meeting, will be included in the Responsiveness Summary portion of the Record of Decision and considered in the final cleanup and closure decision for groundwater at these sites (see page 20).

Irvine Desalter Project

The Irvine Desalter Project (IDP) is a proposed water supply development project initiated by the Orange County Water District and the Irvine Ranch Water District (OCWD/IRWD). Priorities of this project are to extract and treat groundwater to: (1) develop a local water supply drawing from the principal aquifer; (2) intercept, contain, and treat groundwater with high concentrations of total dissolved solids (TDS) and nitrates; (3) and accept and treat for VOC removal the groundwater that the Marine Corps must remediate. The IDP as developed by OCWD/IRWD is composed of two separate components—a Nonpotable System and a Potable System—designed to treat groundwater from two areas in the principal aquifer and from the shallow groundwater unit at Site 24.

- Nonpotable System—groundwater from Site 24 and areas inside the principal aquifer VOC plume (which is contaminated above drinking water standards) would be extracted, treated, and conveyed for use as recycled water. Only the VOC-related portion of the IDP that treats water from Site 24 and areas inside the principal aquifer VOC plume would be considered part of the Marine Corps' CERCLA remedy.
- Potable System—groundwater from areas outside the principal aquifer VOC plume would be extracted and treated to remove TDS and nitrates. There are no known VOCs in the potable well locations. Treated water would then be supplied for domestic purposes. This is not part of the Marine Corps' CERCLA remedy.
- Based on detailed groundwater modeling studies, the VOC plume will remain contained under the proposed extraction plan. Production from the upgradient potable wells will be extracted from groundwater separate from the VOC plume.

IRWD is responsible for planning, land and right-of-way acquisition, design, construction, operation and maintenance of project facilities located off-base, with full review and support assistance from OCWD. OCWD is

responsible for groundwater basin protection and management. The IDP is two projects in one, a potable system and non-potable system. These systems will be kept completely separated from one another to assure the protection of public health.

The IDP was prompted by a regional groundwater study conducted in 1984 that identified the migration of inorganic constituents, mainly TDS and nitrates, from the Irvine area toward the main portion of the Orange County groundwater basin. The elevated levels of TDS and nitrates in groundwater in the Irvine area are mostly attributable to the geology of the area and to agricultural and irrigation practices that have long been prevalent in the region. Later studies identified the presence of TCE in area groundwater. After the discovery of TCE in groundwater, the OCWD/IRWD modified the IDP to treat VOCs in addition to TDS/nitrates.

Cleanup of VOC contamination is the responsibility of the Marine Corps who developed and evaluated several potential remedial alternatives to achieve cleanup. Some of the alternatives for VOC contamination in groundwater relied on the IDP as the key component. The preferred remedy presented in this Proposed Plan is based upon the Nonpotable System component of the IDP.

Under the terms of a settlement agreement negotiated between the United States and OCWD/IRWD, the United States will pay for VOC-related components of the IDP and treatment for VOC removal, and OCWD/IRWD would pay for removal of TDS and nitrates. The United States is not required to pay for removal of TDS and nitrates because the elevated concentrations of these chemicals were not caused by Station operations. This remedy will protect the public and meet the groundwater cleanup objective of the Marine Corps and the water supply objectives of OCWD/IRWD. The settlement agreement was signed by OCWD/IRWD (June 2001) and the United States (U.S. Navy, July 2001; U.S. Department of Justice, September 2001).

Multi-Agency Environmental Team Concurs with Preferred Remedy

The Base Realignment and Closure (BRAC) Cleanup Team (BCT), composed of the Marine Corps, the U.S. Environmental Protection Agency (U.S. EPA), and the Cal-EPA, was established when MCAS El Toro was designated for closure. The primary goals of the BCT are to protect human health and the environment, to expedite the environmental cleanup, and to coordinate the environmental investigations and cleanup at the Station.

The team completed its review of the *Remedial Investigation* and *Feasibility Study* reports for Sites 18 and 24. The team also reviewed the modeling results for OU-1 Alternative 8A and the evaluation of how this alternative meets the U.S. EPA evaluation criteria (see page 18). Based on these reviews and on continuing discussions held regarding the findings of the field investigations, and the results of human health risk assessments, the BCT agrees that the combination of Alternatives 8A and 10B' represents the optimal solution for remediation of groundwater at Sites 18 and 24. The Final ROD that documents soil cleanup will be developed in 2002.

Environmental Investigation Overview

To effectively manage the cleanup effort at MCAS El Toro, the Marine Corps organized the Station's Installation Restoration Program (IRP) sites into Operable Units. Operable Units, or OUs, are areas where similar cleanup activities can be implemented. The MCAS El Toro IRP sites that are the focus of this Proposed Plan are: OU-1 Site 18, Regional Groundwater Plume; and OU-2A Site 24, Volatile Organic Compound (VOC) Source Area. An overview of the environmental investigation results pertaining to groundwater contamination at these two sites and soil contamination at Site 24 is presented below.

Site Background

MCAS El Toro was commissioned in 1943 as a Marine Corps pilot fleet operation training facility. In 1950, the Station was selected for development as a master jet station and permanent center for Marine Corps aviation on the West Coast. The Station's mission involved the operation and maintenance of military aircraft and ground-support vehicles and equipment. Much of the industrial activity (aircraft maintenance and refurbishment) took place in the southwestern quadrant of the Station where Site 24 is located.

The first indication of groundwater contamination at the Station occurred during routine water quality monitoring in 1985 when the Orange County Water District (OCWD) discovered the VOC trichloroethene (also called TCE) in groundwater at an irrigation well approximately 3,000 feet northwest of MCAS El Toro. A VOC is an organic, or carbon-containing, compound that evaporates easily at room temperatures. VOCs are commonly used as solvents for machinery and parts degreasing, paint stripping, and other industrial applications. Groundwater from the above-mentioned irrigation well is used for agricultural purposes. Drinking water wells located approximately three miles from the irrigation well do not contain TCE. Subsequent investigations showed that the VOC contamination originated from Site 24.

Site Descriptions

OU-1 Site 18, Regional Groundwater Plume, is the area of groundwater contamination in the principal aquifer that extends from the source area (Site 24) beyond the western boundary of the Station approximately three miles to the west beneath the City of Irvine. The overall regional groundwater investigation area is bound by Interstate 405, Harvard Avenue, and Trabuco

Road. Figure 2 on page 5 shows the locations of Sites 18 and 24 and the concentrations of TCE in the shallow and principal aquifer.

OU-2A Site 24, the VOC Source Area, encompasses approximately 200 acres in the southwest quadrant of the Station. Site 24 also includes the footprint of the VOC plume in the shallow groundwater unit. Two large aircraft hangers (Buildings 296 and 297) and several smaller buildings within the Site 24 boundary were used for aircraft and support vehicle maintenance and repair. Aircraft maintenance at Buildings 296 and 297 were believed to have used industrial solvents containing TCE for degreasing parts, paint stripping, and aircraft washing. No records were kept that describe the precise origin, nature, and use of TCE at the site, or the circumstances or quantities of individual releases. Solvents released at Site 24 contaminated the soil and groundwater beneath the surface. Solvents containing TCE have not been used at the Station since about 1975.

Previous Studies

After the discovery of TCE in the off-Station groundwater, the Marine Corps conducted several studies that were designed to determine the nature and extent of contamination and plan the best means of remediation.

In 1987, the Marine Corps conducted a perimeter study to investigate whether VOCs were present near the Station boundary. Investigation results indicated that VOCs were present in the shallow groundwater unit near the Station's southwest boundary.

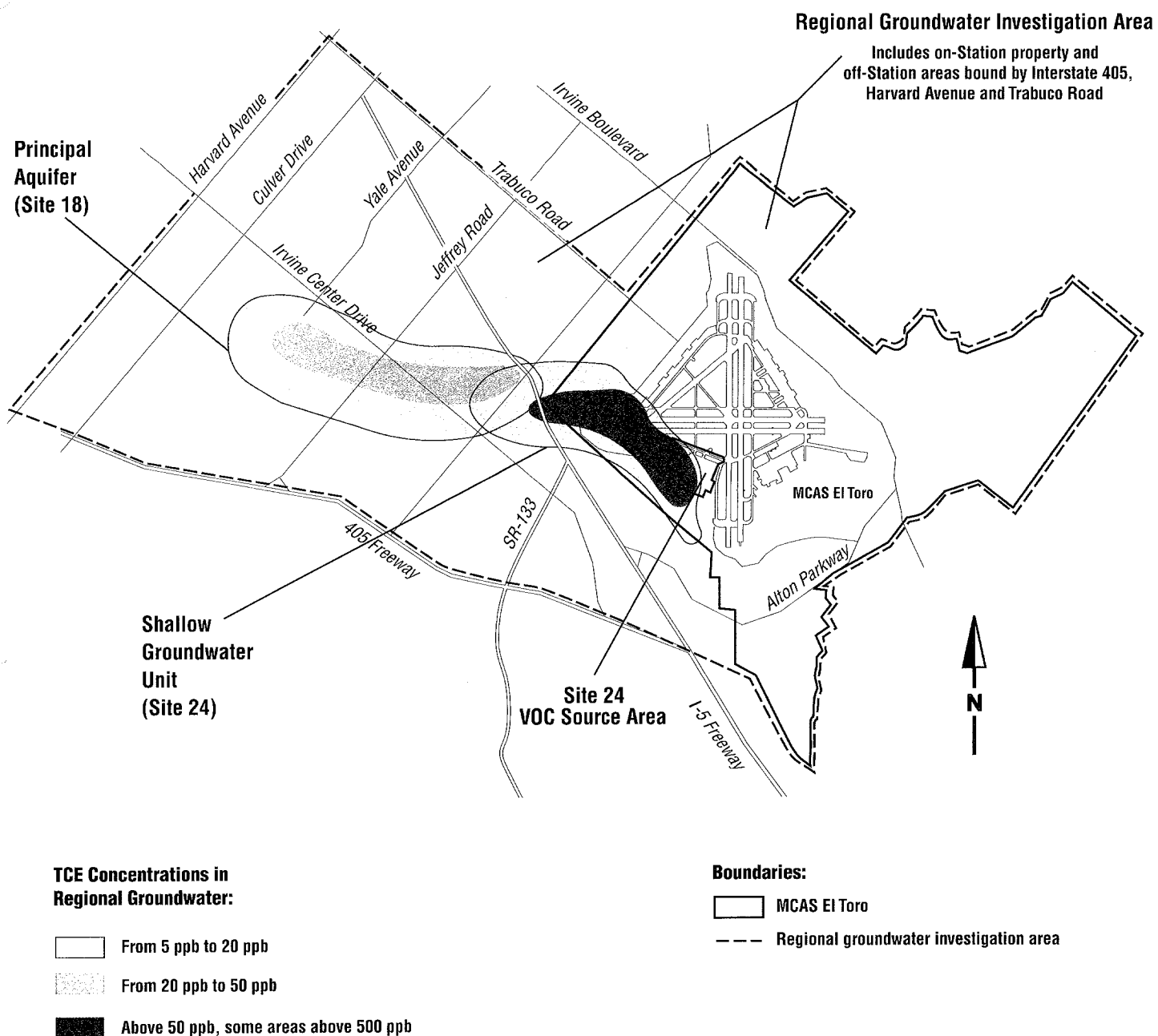
Remedial investigations (RI) of Sites 18 and 24 were conducted from 1992 to 1996. The objective was to further assess and characterize the nature and extent of chemical releases into the environment reported in previous studies and assess potential risks to human health and the environment. Feasibility studies (FS) were performed after the RI to evaluate potential cleanup alternatives for contaminated groundwater at Site 18 and for contaminated groundwater and soil at Site 24.

Remedial Investigation Focus

The RI applied a phased approach to conduct sampling of soil, soil gas, and groundwater to assess the types of contaminants present. The first phase concentrated on IRP sites within the Station to locate the VOC source, and on groundwater west of the Station boundary (OU-1 Site 18) to determine the extent of VOC contamination in groundwater. This early phase of the groundwater investigation tested soil and groundwater for a variety of chemicals (i.e., nitrates, dissolved minerals, and VOCs) and determined that only VOCs were attributed to past Station practices. The second phase of the RI concentrated on Site 24 the VOC Source Area, to further characterize and refine the extent of soil and groundwater contamination.

On July 2, 1999, operational closure of all military activities at MCAS El Toro was completed. The Marine Corps' mission at the Station was incorporated into Marine Corps Air Station Miramar operations in San Diego, California

Figure 2—Site Location Map



During the RI, groundwater samples were collected at different depths from newly constructed monitoring wells, pre-existing wells, and temporary well points in and around Sites 18 and 24. Analysis of groundwater samples provided information needed for determining where and to what extent VOCs are present in groundwater. For each sample, the measured concentration (or level) of the detected chemical was recorded and compared to federal and state *water quality standards*. The data

were mapped as VOC plumes in the groundwater to assess potential risks to human health and the environment. Soil and gas samples were collected from near the surface to the water table at Site 24 to help locate the VOC sources of the regional groundwater plume. Detailed maps and lists of the chemicals and their detected levels are presented in the OU-1 and OU-2A RI/FS Reports. Information on the public availability of these reports is on page 22.

What the Remedial Investigation Found

VOCs in Soil and Groundwater Originate at Site 24

The RI concluded that VOC contamination, primarily TCE, was present in the soil and groundwater at Site 24. The Marine Corps determined that TCE is the predominant VOC present in soil and *soil gas* beneath the area of Buildings 296 and 297. Other VOCs, including tetrachloroethene (PCE), carbon tetrachloride, 1,1-dichloroethene (1,1-DCE), and Freon 113 were also found in the soil at Site 24 but at lower concentrations.

VOC-contaminated soil was not a risk to human health because most of the contamination was located far below the ground surface. However, the VOC-contaminated soil in the area beneath Buildings 296 and 297 was determined to be an ongoing source of the low-level regional VOC groundwater contamination. VOCs, primarily TCE, have migrated from the soil at Site 24 into the shallow groundwater and then into the principal aquifer. In addition to TCE, other VOCs, including PCE, 1,1-DCE, and carbon tetrachloride, are present in the groundwater but at much lower concentrations. Figure 1, presented on page 2, shows the link established between the VOC-contaminated soil and groundwater.

Extent of VOC Plume in Groundwater

Data evaluation focused on determining the extent of the VOC plume in both the shallower groundwater (80 to 110 feet below ground surface), and in the deeper groundwater (200 to 450 feet deep) that makes up the area's principal aquifer. Key findings are summarized below:

- The VOC groundwater plume extends from the VOC Source Area about 3 miles west of the Station.

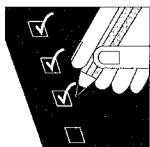
- Within the Station boundaries, TCE is generally limited to shallow groundwater, with the highest concentrations up to 4,850 parts per billion (ppb) beneath the area of Building 296 at Site 24.

- Outside the Station boundaries, the water quality of the shallow groundwater in most cases is better than the federal and state water quality standard of 5 ppb for TCE. In the principal aquifer, TCE concentrations range from barely detectable to above the limit allowed for drinking water. The highest reported concentration of TCE in the principal aquifer was 61 ppb.

- TCE concentrations gradually decrease as the contamination moves farther away from the source area.

Human Health Risk Assessment

As part of the remedial investigations, human health risk assessments were performed at OU-1 Site 18, Regional Groundwater Plume and OU-2A Site 24, VOC Source Area, to evaluate whether environmental cleanup or controls are necessary as a result of potential risks to human health from exposure to untreated groundwater. Results from the risk assessments indicate that if action is not taken to remediate groundwater and/or prevent exposure to untreated groundwater, potential risks to human health are present if untreated water is used for domestic purposes (i.e., drinking or bathing). Ecological risk assessments, which evaluate risks to plant and animal life from exposure to contaminants, were not performed at either site because no wildlife is present at the highly industrialized Site 24 and groundwater is present too far below the surface of either site for plant and animal exposure. The human health risk assessment results are discussed on page 7.



Subsequent to the RI, a risk assessment was also performed for chemicals in groundwater from the well that provides water for North Lake. This lake is used year round for recreational purposes. The risk assessment showed that the groundwater does not pose an unacceptable risk to human health.

Identifying Exposure Pathways

To assess potential human health risks, information on the types and amounts of chemicals present at each site was collected during the remedial investigations. Possible exposure pathways, which show how people could come in contact with these chemicals, were then identified. The residential risk assessment hypothetically assumes people are living at a site for a period of 30 years.

To determine potential risks from exposure to untreated groundwater, the human health risk assessments assumed that untreated groundwater from Sites 18 and 24 would serve as a source of water for *domestic use*. The hypothetical assumptions are considered conservative because there is no current use of the groundwater for domestic purposes. Site 24 is also expected to continue to be used for industrial, not residential, purposes in the future.

Estimating Human Health Risks

Calculated risk levels are an indication of potential risks, and are not an absolute prediction that risk will occur at a certain level. Actual human exposures and risks are likely to be much

less than those calculated for the risk assessments. The assumptions made during the risk assessment process are intended to lead to an overestimation of risk and provide a margin of safety to protect public health and the environment.

Risks to human health associated with exposure to and toxicity of chemicals were estimated for cancer-causing (carcinogenic) and noncancer-causing (noncarcinogenic) effects. For carcinogens, potential risk is expressed in terms of the probability of an individual contracting cancer (cancer risk). To estimate noncancer risks, a hazard index is applied. The probability of an individual contracting cancer is expressed as the number of additional cancer cases that would occur within a population, and is calculated assuming an individual has an extended exposure to the chemicals (30-year period). The term "additional cancer cases" refers to cancer cases that could occur, in addition to those cases that otherwise occur in a population not exposed to the chemicals in untreated groundwater.

To manage risks and protect human health from known or suspected carcinogens, the U.S. EPA has established generally allowable *exposure levels* at general concentration levels that represent an *excess* lifetime cancer risk to an individual of between 10^{-4} (1 additional case in a population of 10,000) and 10^{-6} (1 additional case in a population of 1,000,000). Risk estimates between 10^{-4} and 10^{-6} may call for remedial action and estimates greater than 10^{-4} usually call for remedial action. Various site specific factors such as exposures, types of contaminants, and potential future uses are factored into the determination and selection of a remedy that protects human health.

In addition, for groundwater actions, federal and state MCLs (*maximum contaminant levels*) and non-zero MCLGs (*maximum contaminant level goals*) for specific chemicals are generally used to gauge whether remedial action is warranted. MCLs are the maximum permissible level of a contaminant delivered to any user of a public water system. MCLs are enforceable standards. Under the federal Safe Drinking Water Act, MCLGs are non-enforceable concentrations of drinking water contaminants, set at the level at which no known or anticipated adverse effects on human health occur. MCLGs are usually the starting point for determining the regulated MCL.

Noncarcinogenic risks are expressed as a hazard index. The U.S. EPA considers a hazard index of less than 1 as protective of human health. A hazard index of 1 indicates that the exposure to the chemicals has limited potential for causing adverse health effects (e.g., respiratory distress). A site with a hazard index greater than 1 does not by itself require remedial action, but indicates the need to take into account the types of chemicals, historical activities, and potential toxic effects of the chemicals of concern.

Risk Assessment Results

Groundwater



The additional chance of a resident contracting cancer from exposure to untreated groundwater is greater than 10^{-4} at some locations in the shallow groundwater unit beneath Site 24. In the principal aquifer, VOC concentrations are much lower, and the corresponding risk levels due to VOCs are between 10^{-5} and 10^{-6} . Risk that was estimated from exposure to naturally occurring inorganic compounds (dissolved minerals) and manmade compounds such as nitrates (from fertilizers) in the principal aquifer was somewhat higher, on the order of 10^{-4} to 10^{-5} . Elevated concentrations of inorganic chemicals and nitrates that cause these risks are believed to be the result of the geology of the area and agricultural practices, not Marine Corps activities.

The human health risk assessments also indicated that there is a potential for noncancer risks associated with exposure to untreated groundwater. In the shallow groundwater unit, the hazard index exceeded 1 for both adult and child residents. Potential noncancer risks were due to TCE and carbon tetrachloride. Noncancer risks also exceeded a hazard index of 1 in several wells at Site 18 due to TCE, carbon tetrachloride, herbicides, inorganics, and nitrates. Only the risks due to VOCs are attributable to Station activities (past use of industrial solvents for aircraft maintenance).

Human health risks (cancer-causing and noncancer-causing) in the shallow groundwater unit were high enough to warrant remedial action. The VOCs in the principal aquifer exceed MCLs. Therefore, remedial action is being taken to bring the VOCs into compliance with the water quality standards.

INTERNET CONNECTION



For access to information on MCAS El Toro (Restoration Advisory Board meeting minutes, proposed plans, and fact sheets), check out the *Southwest Division Naval Facilities Engineering Command Web Site* at:

www.efdswnavfac.navy.mil/environmental/envhome.htm

Summary of Groundwater Remedial Alternatives

The Marine Corps' remedial action objectives for the shallow groundwater unit and principal aquifer are to:

- reduce concentrations of VOCs in groundwater to the more stringent of federal or state water quality standards;
- control the migration of groundwater containing VOCs above cleanup levels; and
- prevent domestic use of groundwater containing VOCs above cleanup levels until cleanup is complete.

These objectives shaped the development of several remedial alternatives that would prevent exposure to contaminated groundwater, minimize further migration of already-contaminated groundwater, and restore the groundwater to federal and state cleanup levels, known as maximum contaminant levels or MCLs. The MCLs represent water quality standards that are protective of human health. Table 1 shows the criteria and standards for the VOCs most commonly detected in groundwater at Sites 18 and 24.

Development of Alternatives

Remedial alternatives are developed and evaluated by performing a feasibility study. Separate feasibility studies were conducted for Site 18 and Site 24, however these studies were prepared in close coordination to ensure consistency of approach and ensure that the Marine Corps looked at a wide

range of possible alternatives. Alternatives for Site 18 were developed and evaluated in the Draft Final Interim Action Feasibility Study Report issued in August 1996. Site 24 alternatives were presented in the Draft Final Phase II Feasibility Study issued in December 1997.

In 2000, a final alternative was developed for Site 18. This alternative is a refinement based on the other alternatives evaluated. A description and technical evaluation of the alternative was transmitted to the regulatory agencies by means of a technical memorandum in April 2001. A copy of this technical memorandum is available for review in the Administrative Record file and at the Information Repository (see page 22).

The first step in the feasibility study process was to identify and evaluate a wide range of potential technologies to accomplish the cleanup objective. This evaluation focused on technologies to contain the migration of contaminants in groundwater, treat the groundwater in place (*in situ* treatment), or treat the groundwater once it has been extracted to the surface (*ex situ* treatment). The Marine Corps also evaluated a variety of technologies to use or dispose of the extracted and treated groundwater. Each of these technologies was screened on the basis of its effectiveness, implementability, and cost, consistent with U.S. EPA and National Oil and Hazardous Substances Contingency Plan (NCP) guidance for feasibility studies. The most effective technologies were developed into remedial alternatives and subjected to further evaluation. Table 2 shows technologies evaluated for groundwater at Sites 18 and 24.

Computer modeling was used to evaluate the most effective remedial alternatives. Investigation results have demonstrated that there is a connection between the soil, which was the source of contamination, and the shallow groundwater unit and principal aquifer. Therefore, the modeling was used to simulate VOC *infiltration* through the soil and the movement of VOCs in groundwater over the next 20 to 40 years. By varying the location and number of wells, the model was used to compare the relative rate of contaminant removal, amount of migration of contaminants, and time to reach the state and federal cleanup standards.

Groundwater Remedial Alternatives

The remedial alternatives developed in the feasibility studies consist of a No Action alternative and a variety of alternatives that actively treat contaminated areas.

Table 1
Criteria and Standards for VOCs Most Commonly
Detected in Groundwater at MCAS El Toro Sites 18 and 24
Round 12 Routine Groundwater Monitoring (June 2000)

Chemical VOC	Concentration (parts per billion)		
	U.S. EPA Maximum Contaminant Level (MCL)	California Maximum Contaminant Level (MCL)	Maximum Reported Concen- tration
Carbon tetrachloride	5	0.5	14
1,1-Dichloroethene	7	6	28
<i>cis</i> -1,2-Dichloroethene	70	6	9.2
Tetrachloroethene (PCE)	5	5	5
Trichloroethene (TCE)	5	5	1,009

Sources:

Federal and state cleanup standards are established in 40 Code of Federal Regulations §141.61(a) and Title 22 California Code of Regulations §64444, respectively.

Notes:

- 1) The U.S. Marine Corps cleanup standard is the more stringent of the federal and state MCLs.
- 2) Maximum reported concentrations from Round 12 Routine Groundwater Monitoring Report conducted in June 2000.

Table 2
Technologies Evaluated for OU-1 and OU-2A
Feasibility Studies

Containment

Hydraulic Containment (wells)
 Physical Barriers (slurry wall)

Removal of Contaminants

Groundwater Extraction (wells)
 Vacuum-Enhanced Groundwater Extraction

In-Situ Treatment (performed in place)

Monitored Natural Attenuation
 Treatment of Groundwater in Place (air sparging or bioremediation)

Ex-Situ Treatment (remove and treat above ground)

Physical Treatment of Extracted Groundwater (carbon adsorption, air stripping, steam stripping)
 Chemical Treatment of Extracted Groundwater (oxidation)
 Biological Treatment of Extracted Groundwater (bioremediation)
 Air Emission Controls and Treatment (adsorption, catalytic conversion, thermal destruction)

Discharge/Use

Discharge to Publicly Owned Treatment Works
 Discharge to Surface Waters
 ReInjection of Treated Groundwater
 Evaporation Ponds
 Beneficial Use (domestic, irrigation, etc.)

The No Action alternative is used as a baseline against which the other alternatives are evaluated. Except for the No Action alternative, each of the remedial alternatives for groundwater at Sites 18 and 24 contains four components:

- extracting groundwater from the shallow groundwater unit and/or principal aquifer;
- treating the extracted groundwater for VOCs to meet water quality standards for disposal or use;
- disposing of or using the treated groundwater;
- preventing inadvertent use of contaminated groundwater until remediation is complete.

The alternatives differ in the estimated number and conceptual placement of groundwater extraction wells, treatment methodology, and the disposal options used. Common elements of each alternative are the use of institutional controls such as deed restrictions to protect extraction and monitoring equipment and prevent inadvertent use of contaminated groundwater until remediation is complete. Institutional controls also ensure that

provisions exist for access by the Department of the Navy (DoN) and the regulatory agencies to conduct or oversee monitoring and maintenance activities. SVE was accepted as the remedial alternative for soil at Site 24 in an Interim ROD signed in September 1997, and was implemented beginning in 1999. The Final ROD that documents cleanup of the soil will be developed in 2002. For information on remediation of VOC-contaminated soil conducted at Site 24, see page 15.

Site 18 Alternatives

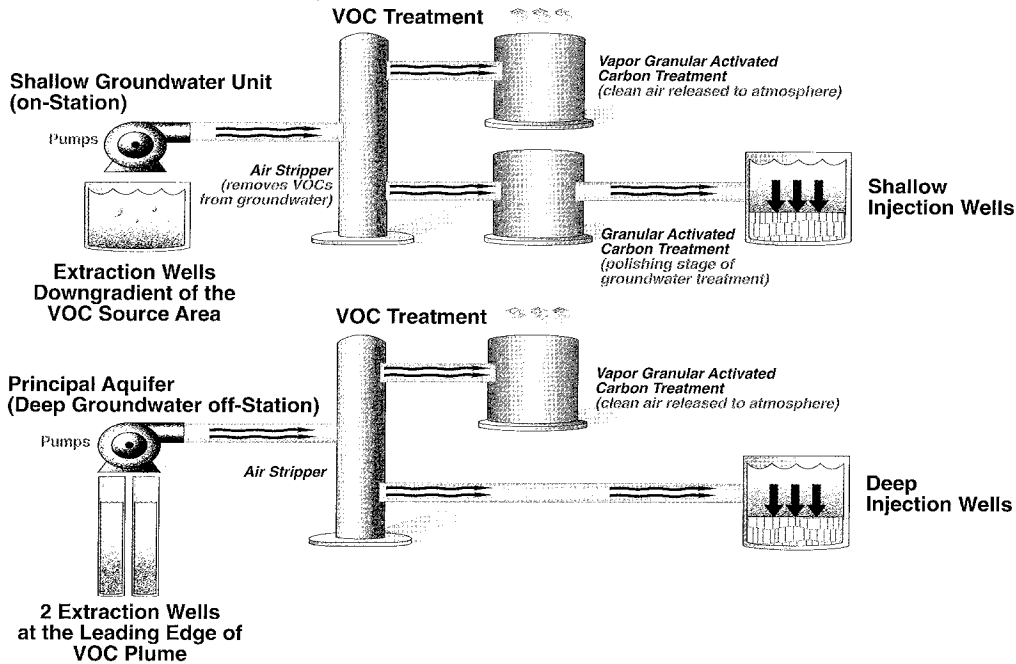
Twelve alternatives were initially evaluated for Site 18. Nine alternatives were screened out based on effectiveness, implementability, and cost. In addition to the No Action alternative, two alternatives, 2A and 6A, were retained for detailed evaluation due to their effectiveness in terms of the mass of VOCs removed, time to remediate the groundwater, and cost.

When BRAC Cleanup Team (BCT) members, U.S. EPA, Cal-EPA Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB), reviewed the Draft Interim Action Feasibility Study in 1995, concern was expressed over the high cost of groundwater extraction and treatment to reduce the low concentrations of TCE in the principal aquifer (Alternative 2A – \$56.4 million and Alternative 6A – \$40.3 million, see page 17). The BCT suggested that the Marine Corps evaluate lower-cost alternatives and a *monitored natural attenuation* approach for the principal aquifer. In response to agency comments, the Marine Corps developed three additional alternatives (7A, 7B, and 8). These alternatives incorporate some monitored natural attenuation in the principal aquifer combined with extra *monitoring wells* that are used to assess the progress of *natural attenuation*.

In 2000, an additional alternative, Alternative 8A, was developed by the Irvine Ranch Water District and Orange County Water District to address public concerns with reuse of treated VOC plume groundwater. This alternative uses separate treatment systems depending on whether groundwater is contaminated or uncontaminated. The technical adequacy of Alternative 8A was evaluated by means of computer modeling. Results were provided to the BCT in April 2001 in an attachment to a technical memorandum titled, Evaluation of Alternative 8A with Respect to National Contingency Plan Criteria, and are part of the Administrative Record file.

To assist readers in understanding the alternatives developed for Sites 18 and 24, brief descriptions and illustrations are presented on pages 10 through 13. Table 3 on page 14 provides a comparison summary of the OU-1 alternatives for the principal aquifer followed by a similar comparison of the OU-2 alternatives for the shallow groundwater unit.

Alternatives 2A and 9 Conceptual Design



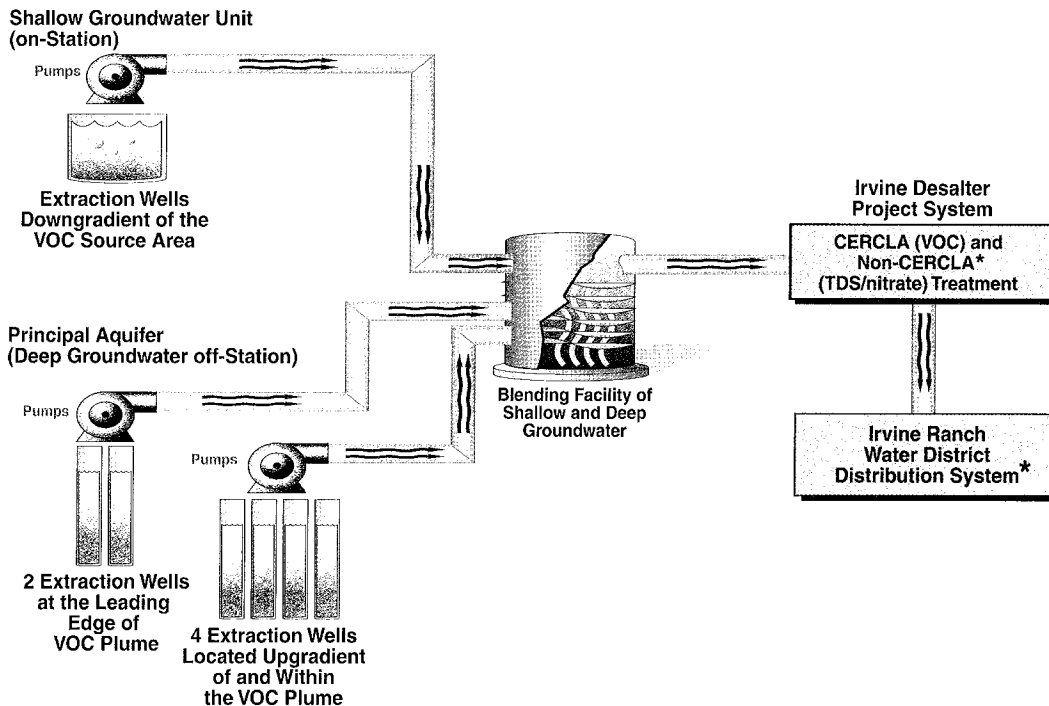
Operation of the SVE system at Site 24 is an integral part of Alternative 9.

Site 18 Alternatives

Alternative 2A – involves construction of separate groundwater extraction, treatment, and injection systems for the shallow groundwater unit and principal aquifer. Groundwater from each of these areas is conveyed (piped) to separate treatment facilities to remove VOCs and is then pumped (injected) back into the groundwater unit it came from. Cleanup of the shallow groundwater unit is estimated to take 52 years, and the principal aquifer 43 years.

Alternative 6A – groundwater from the shallow groundwater unit and principal aquifer is extracted, blended (mixed), and conveyed to the IDP for removal of VOCs. Treated groundwater is distributed to the public for domestic purposes such as drinking and bathing. Cleanup of the shallow groundwater unit is estimated to take 48 years, and the principal aquifer 49 years.

Alternatives 6A and 10A Conceptual Design



* Associated with local water supply. TDS/nitrate treatment is not a component of the CERCLA remedial action requirements.

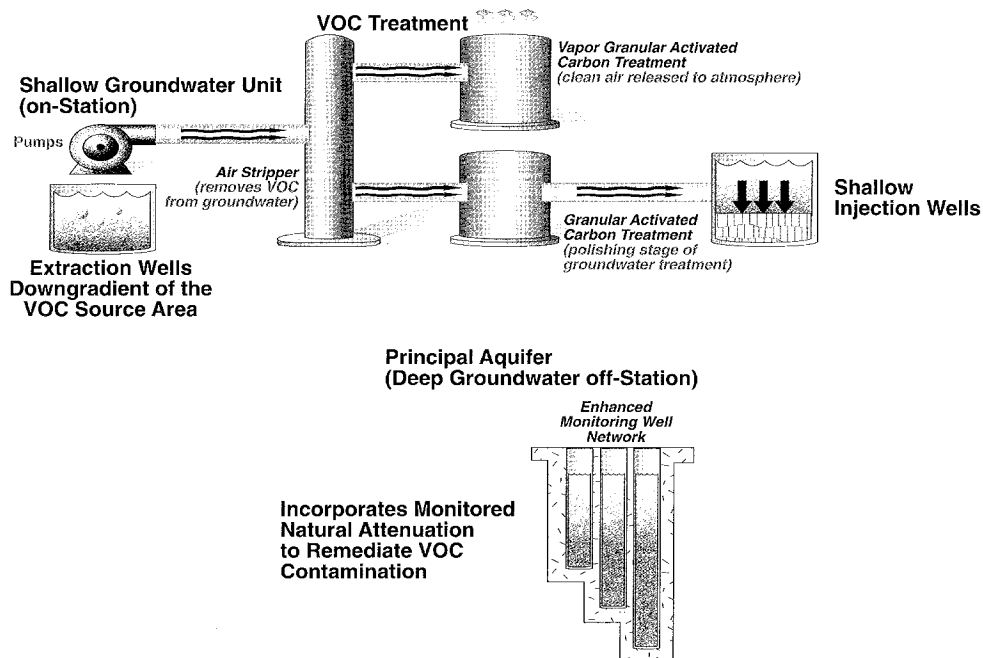
Operation of the SVE system at Site 24 is an integral part of Alternative 10A.

Alternative 7A – uses the same shallow groundwater extraction, treatment, and reinjection system as 2A and incorporates monitored natural attenuation to remediate VOC contamination in the principal aquifer. Shallow groundwater unit cleanup is estimated to take 52 years, and the principal aquifer 60 years.

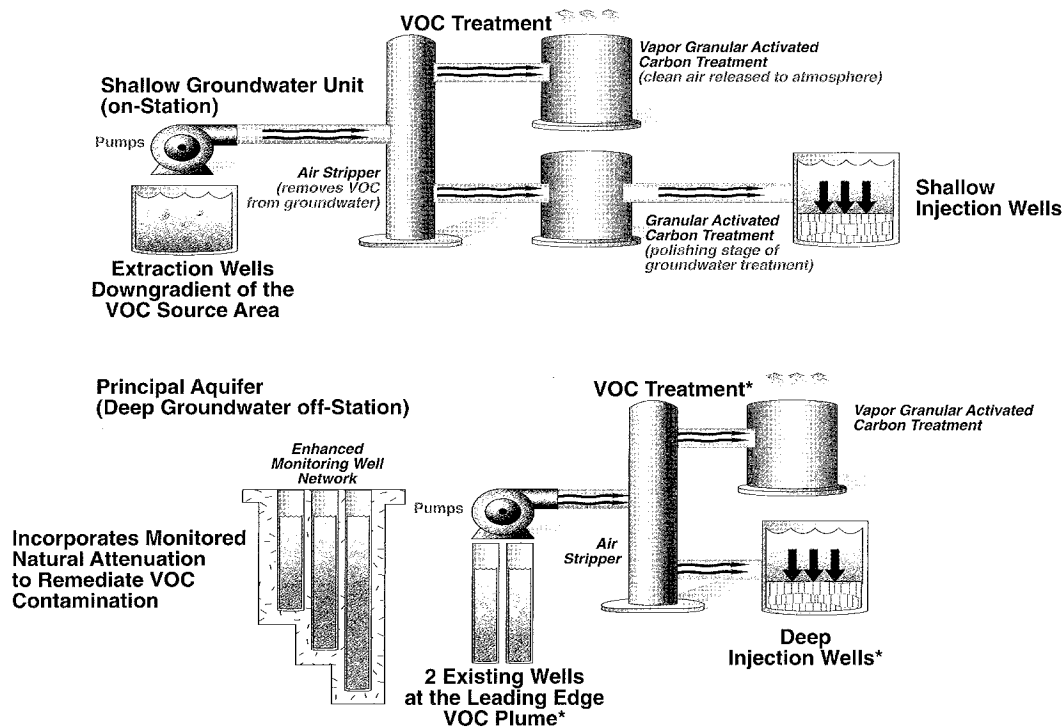
Alternative 7B – is identical to 7A except it is assumed that after 10 years two existing irrigation wells at the leading edge of the VOC plume are no longer used for agriculture due to reduced demand or because TDS concentrations are too high for irrigating crops. In Alternative 7B, the Marine Corps acquires the existing irrigation wells after 10 years, treats the extracted groundwater from these wells to remove VOCs, and injects the treated groundwater upgradient of the VOC plume in the principal aquifer. Cleanup of both the shallow groundwater unit and the principal aquifer is estimated to take 54 years.

Alternative 8 – extracts groundwater from wells downgradient in the shallow groundwater unit and from five existing wells located upgradient of and within the VOC plume in the principal aquifer. Water from both extraction well systems is blended and conveyed to the IDP for treatment and reuse for domestic purposes. Groundwater downgradient of the extraction wells is remediated using monitored natural attenuation. Shallow groundwater unit cleanup is estimated to take 59 years, and the principal aquifer 70 years.

Alternative 7A Conceptual Design

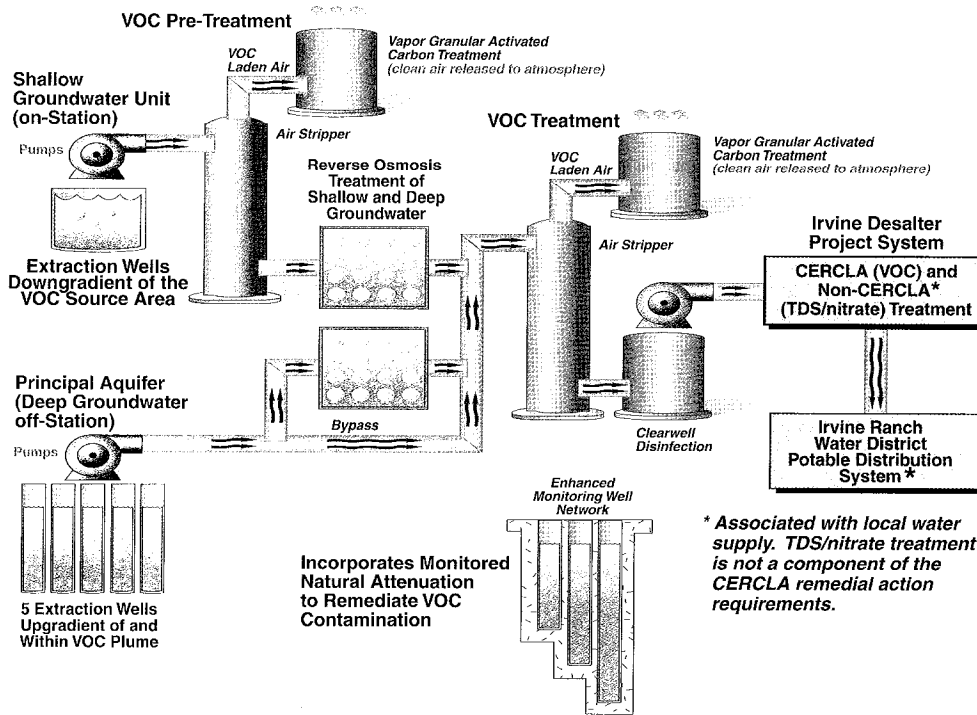


Alternative 7B Conceptual Design



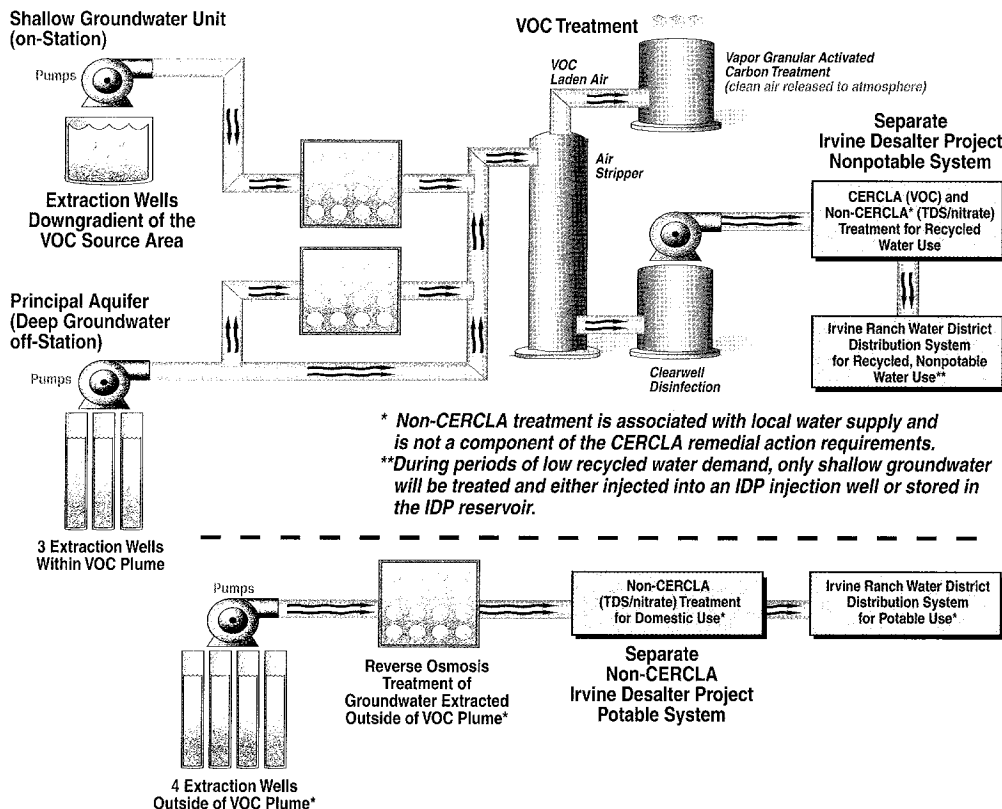
* Component for groundwater extraction, VOC treatment and reinjection after first 10 years of monitored natural attenuation.

Alternative 8 Conceptual Design



Alternative 8A – Contaminated groundwater from the shallow groundwater unit and from within the VOC plume in the principal aquifer is extracted, blended, and conveyed to the IDP for removal of VOCs during a portion of the year. Treated groundwater is used for non-domestic purposes such as irrigation and industrial water supply. During some times of the year it is assumed that water is not needed for irrigation or other purposes. During those time periods, groundwater will not be extracted from the principal aquifer. Groundwater will continue to be extracted from the shallow groundwater unit. The extracted water will be treated at the IDP and will be injected downgradient of the shallow groundwater unit VOC plume or stored in an IRWD non-potable reservoir. An independent non-CERCLA system extracts groundwater from areas outside the VOC plume. This water is treated to remove low concentrations (below drinking water standards) of VOCs and to remove TDS and nitrates. Treated water from the non-CERCLA system is distributed for domestic use. Cleanup of the principal aquifer is estimated to take 95 years and could take significantly less time depending on the final well sites selected and the extraction rates.

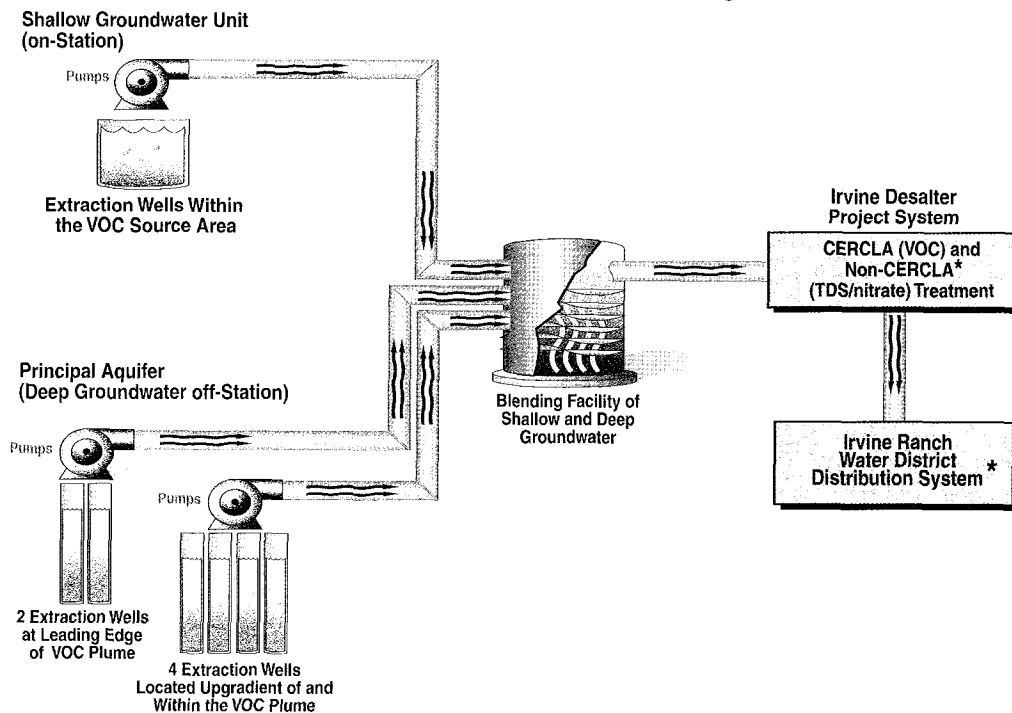
Alternative 8A Conceptual Design



Site 24 Alternatives

In addition to the No Action alternative required by the NCP, four other alternatives (9, 10A, 10B, and 11) were developed for Site 24. All of these alternatives used computer modeling to simulate the removal of contaminants from the soil at Site 24 using soil vapor extraction technology.

Alternative 10B Conceptual Design



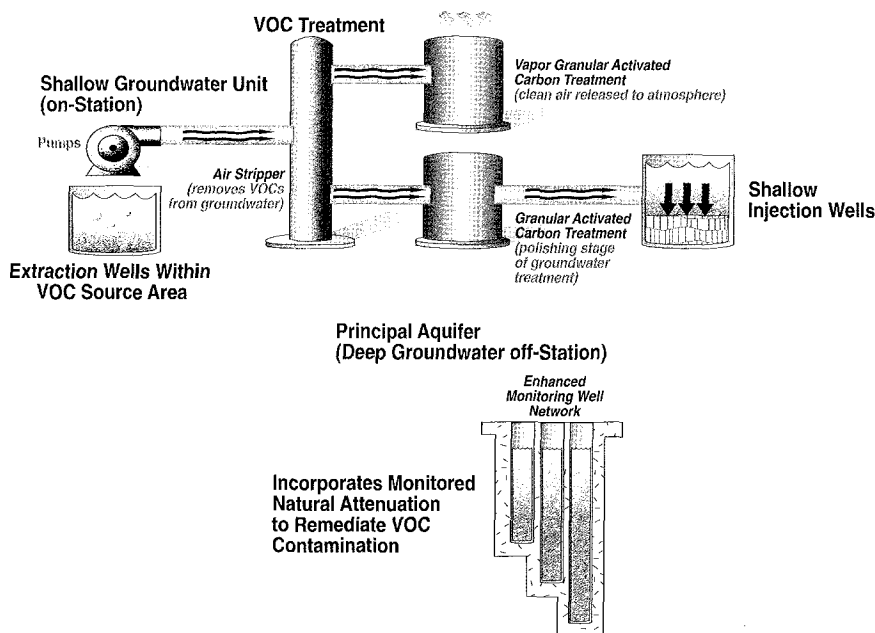
* Associated with local water supply. Not a component of the CERCLA remedial action requirements.
Operation of the SVE system at Site 24 is an integral part of Alternative 10B.

Alternative 9 – is identical to the Site 18 Alternative 2A except for slightly different assumptions used in the computer modeling, including operation of the SVE system, which reduces cleanup time. See page 10 for the illustration of the conceptual design. Shallow groundwater unit cleanup is estimated to take 44 years, and the principal aquifer 25 years.

Alternative 10A – is identical to the Site 18 Alternative 6A except for slightly different assumptions used in the computer modeling, including operation of the SVE system. See page 10 for the conceptual design illustration. Cleanup time of the shallow groundwater unit is estimated to take more than 80 years, and the principal aquifer 30 years.

Alternative 10B – is similar to the Site 24 Alternative 10A (and Site 18 Alternative 6A) except that the extraction wells in the shallow groundwater unit are located within the areas with the highest VOC contamination. Groundwater is extracted from these wells in the shallow groundwater unit, blended with groundwater extracted from wells in the principal aquifer, and conveyed to the IDP for treatment of VOCs. Shallow groundwater unit cleanup is estimated to take 19 years, and the principal aquifer 34 years.

Alternative 11 Conceptual Design



Operation of the SVE system at Site 24 is an integral part of Alternative 11.

Alternative 11 – is similar to the Site 18 Alternative 7A except that the extraction wells in the shallow groundwater unit are located in the areas with the highest VOC concentrations. Groundwater in the principal aquifer is remediated using monitored natural attenuation. An enhanced monitoring well network would be used to assess the progress of natural attenuation. Shallow groundwater unit cleanup is estimated to take 38 years, and the principal aquifer 31 years.

Table 3**Comparison of Operable Unit 1 Site 18 Alternatives**

Alternative No.	Primary Purpose of Principal Aquifer Remediation	Where Principal Aquifer Groundwater Treated and by Whom	Reuse of Treated Groundwater	Estimated Remediation Time in Principal Aquifer (Years)	Estimated Total Mass of VOCs Removed in 20 Years (Pounds)
2A	Containment	Navy treats groundwater from the principal aquifer at off-Station treatment facility	Injected back into principal aquifer	43	12,540
6A	Mass removal and containment	IDP* joint treatment facility	Distributed to the public for domestic water purposes	49	13,750
7A	Monitored natural attenuation	No treatment of groundwater from the principal aquifer	None	60	11,830
7B	Monitored natural attenuation with containment after 10 years	After 10 years, Navy treats groundwater at an off-Station treatment facility	Injection after 10 years	54	11,750
8	Mass removal	IDP joint treatment facility	Distributed to the public for domestic water purposes	70	13,200
8A	Mass removal and containment	IDP joint treatment facility	Distributed to the public for recycled water purposes	95+	14,000

Comparison of Operable Unit 2A Site 24 Alternatives

Alternative No.	Primary Purpose of Shallow Groundwater Unit Remediation	Where Shallow Groundwater Treated and by Whom	Reuse of Treated Groundwater	Estimated Remediation Time in Shallow Groundwater Unit (Years)	Estimated Total Mass of VOCs Removed in 20 Years (Pounds)
9	Containment	Navy treats at on-Station facility	Injected back into shallow groundwater unit	44	4,870
10A	Containment	IDP joint treatment plant	Distributed to the public for domestic water purposes	80	4,570
10B	Mass removal	IDP joint treatment plant	Distributed to the public for recycled water purposes	19	4,630
11	Mass removal	Navy treats at on-Station facility	Injected back into shallow groundwater unit	38	4,800

Notes:

*IDP = Irvine Desalter Project

+ Computer modeling shows that Alternative 8A is the most effective alternative during the first 20 years of operation at removing the initial mass of VOC contamination. By further optimizing the well placement of the extraction wells in the remedial design phase, remediation time may be significantly shortened.

- A comparative Cost Estimate Summary of the OU-1 and OU-2 alternatives are presented on Table 4 on page 17.
- The No Action alternative, which is used as a baseline to evaluate other alternatives, is not listed above.

Cleanup Progress of VOC-Contaminated Soil at Site 24

Remedial action objectives for soil were to: reduce concentrations of VOCs in the VOC Source Area to prevent or minimize further degradation of the shallow groundwater unit above the MCL for drinking water; and continue vadose zone remediation until the average VOC soil gas concentrations are below threshold concentrations (concentrations capable of contaminating groundwater above the MCLs). In September 1997, the BRAC Cleanup Team signed an Interim Record of Decision (ROD) that documented the remedy selected to remove VOCs from soil and established cleanup goals to determine when remediation was complete. VOC-contaminated soil at Site 24 is not a risk to human health because VOC concentrations near the surface are very low. However, at the time of the RI, contaminated soil was a potential ongoing source of contamination to the groundwater. Cleanup goals were developed to help minimize or prevent groundwater contamination above the MCLs. At the time of the FS, cleanup of soil was estimated to take 2 to 4 years to complete. Actual cleanup time has been significantly less.

Site 24 Soil Gas Concentrations and Cleanup Goals

VOC	Maximum Pre-cleanup Concentrations*	Soil Gas Cleanup Goals in Interim ROD*	Maximum Post-cleanup Concentrations*
Trichloroethene (TCE)	6,120	27	13
Tetrachloroethene (PCE)	192	69	30
Carbon tetrachloride	31	61	N/A**
1,1-Dichloroethene	447	563	N/A**

*(micrograms per liter)
 **Not applicable (pre-cleanup concentrations were below cleanup goals)

SVE was the process selected for remediation of soil at Site 24. This process effectively removes VOCs from the soil without requiring excavation. VOCs are removed when a vacuum is applied to a network of underground extraction wells above the groundwater table, and contaminants, in the form of vapor or gas, are pulled to the surface. The extracted VOC vapors are passed through a granular activated carbon filter system. VOCs are trapped on the granular activated carbon filters and clean air is dispersed into the atmosphere. The activated carbon is then transported to an off-Station treatment facility for regeneration so it can be used again.

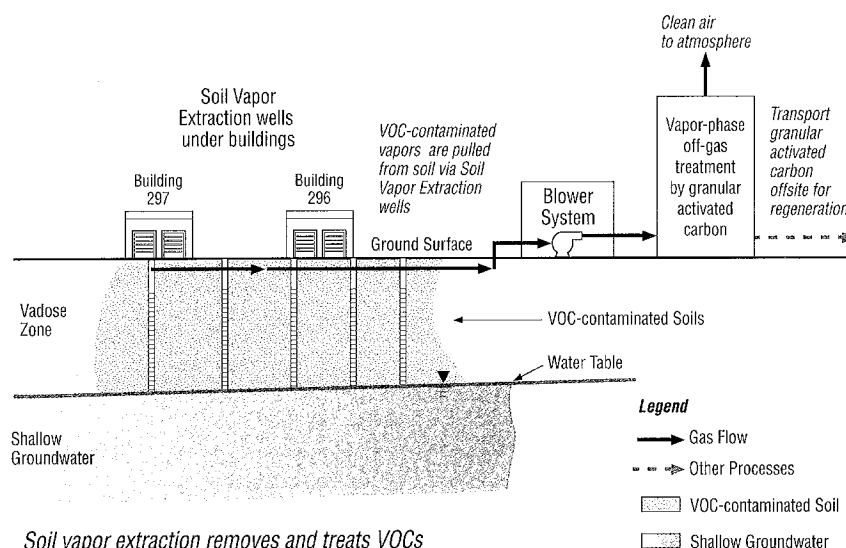
Pilot tests conducted at Site 24 prior to the remedial action removed approximately 870

pounds of TCE, demonstrating that SVE is effective, technically feasible for site conditions, and poses a minimum of risk to public health and the environment.

To remediate soil, the Marine Corps used the treatment equipment that successfully removed VOCs from soil at Norton Air Force Base in San Bernardino, California. Transfer and installation of that equipment was completed in 1998. In January 1999, the remedial design for the SVE system was completed and operational testing of the Central Treatment System remediation equipment commenced. The remedial action began in March 1999 with the use of portable SVE systems to extract from existing SVE wells. The Central Treatment System operations and installation of the initial phase of additional SVE wells and the associated vapor conveyance piping began in May 1999.

Significant progress in remediating the vadose zone soils had taken place and vapor concentrations at all the SVE wells were below the soil gas cleanup goals by the end of calendar year 1999. **Rebound** testing of existing SVE wells and the installation of supplemental SVE wells to confirm that soil gas cleanup goals have been achieved throughout the soil gas plume was completed in April 2000. Closure verification sampling was completed in September 2000 and a draft vadose zone closure report documenting that soil gas cleanup goals have been attained was submitted for regulatory review in June 2001. The Final ROD to document completion of soil cleanup at Site 24 will be developed in 2002.

Figure 3—SVE Treatment Process - Site 24



The Marine Corps' Preferred Remedy for Groundwater Cleanup

The Marine Corps has proposed Alternative 8A for remediation of the principal aquifer at Site 18 and Alternative 10B' for remediation of the shallow groundwater unit at Site 24. These alternatives are based in part upon CERCLA-related aspects of the proposed Irvine Desalter Project addressed in a settlement agreement entered into by the United States and OCWD/IRWD. Key components of the preferred alternative and related settlement agreement are summarized below. The Marine Corps' rationale for proposing these alternatives is presented on page 19.

Alternative 8A – consists of three extraction wells located within the VOC plume in the principal aquifer. These wells are assumed to have a combined seasonal extraction rate of 2,500 gallons per minute. The Marine Corps, OCWD/IRWD, and regulatory agencies will establish the exact well locations and pumping rates during the remedial design phase. Cleanup time of the principal aquifer is estimated at 95 years and could take significantly less time depending on the final well sites selected and the extraction rates.

Alternative 10B' (pronounced Alternative 10B prime) – a variation of Alternative 10B that conceptually consists of multiple extraction wells located within the areas of highest VOC concentration in the shallow groundwater unit at Site 24. Alternative 10B' differs from Alternative 10B in that the minimum extraction flow rate is reduced from 800 gallons per minute to 440 to 550 gallons per minute. The Marine Corps, OCWD/IRWD, and the regulatory agencies will establish the actual number and location of the wells during the remedial design phase. Even though the total pumping rate is reduced, computer modeling shows the time to remediate VOCs in the shallow groundwater unit to the MCLs is approximately the same as Alternative 10B. Shallow groundwater unit cleanup is estimated at 20 years and could take significantly less time depending on the final well sites selected and the extraction rates.

Institutional Controls – The preferred alternative also includes institutional controls to protect extraction and monitoring equipment, prevent inadvertent use of contaminated groundwater, and allow access for monitoring, maintenance, and any additional remediation.

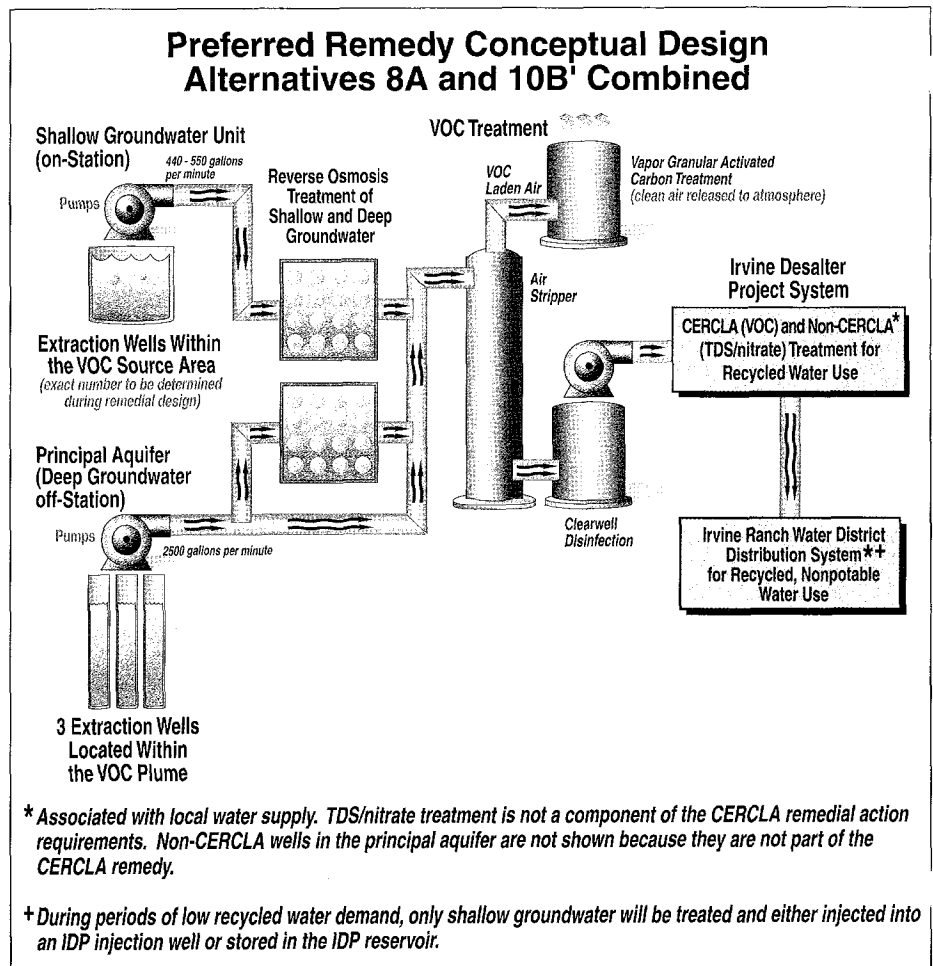
Additional Measures – If the Marine Corps' preferred remedy is selected, the Record of Decision will include specific procedures designed to provide additional protection to the public beyond groundwater remediation and compliance with water quality standards. In the unlikely event that additional contaminants are detected that might not be adequately treated by the IDP, these procedures will pro-

vide for temporary and/or permanent shutdown of the IDP, subject to concurrence by the Marine Corps, U.S. EPA, and Cal-EPA, pending further study of the need for additional treatment.

The ROD will also provide that the Marine Corps will conduct further evaluation of monitored natural attenuation for the principal aquifer if the IDP is permanently terminated for any reason. This is based upon currently available information indicating that natural attenuation may be an appropriate backup remedy in the event of IDP termination.

Settlement Agreement — The United States and OCWD/IRWD have negotiated a settlement agreement concerning incorporation of the VOC-related components of the IDP into a CERCLA Record of Decision for VOC-contaminated groundwater at Operable Unit 1 Site 18 and Operable Unit 2A Site 24. The settlement agreement also resolves the liability of the United States to OCWD/IRWD for treatment of contaminants. Under this agreement, the United States will bear the costs of VOC treatment of extracted groundwater from the principal aquifer and a share of the associated extraction and conveyance (piping) costs. OCWD/IRWD will continue to bear the normal costs associated with non-domestic, recycled water supply and treatment requirements including those for TDS and nitrates.

The preferred remedy and the settlement agreement together



benefit the Marine Corps, OCWD/IRWD, and the public. The Marine Corps benefits through avoidance of costs for groundwater disposal. OCWD/IRWD benefits because the United States pays for a portion of the costs associated with the IDP. The public benefits from being able to restore a valuable water resource, improve supply reliability, and allow development of both potable and nonpotable water supply sources.

This settlement agreement was approved and signed by representatives from OCWD/IRWD (June 2001), and the United States of America, Department of the Navy (July 2001), and Department of Justice (September 2001). The settlement agreement is contingent upon finalization of a ROD selecting the preferred remedy, Alternatives 8A and 10B' combined, and will take effect upon the date the final signature is obtained from the BRAC Cleanup Team signatories (the Navy, U.S. EPA, Cal-

EPA Department of Toxic Substances Control, and the California Regional Water Quality Control Board). Although the Marine Corps is not soliciting comment on this settlement agreement, a signed copy is available in the Administrative Record file.

The Marine Corps and OCWD have also negotiated a separate contract for OCWD/IRWD to accept, treat for VOCs, and take ownership of the groundwater extracted from the shallow groundwater unit. OCWD/IRWD has already signed the contract. The Department of the Navy will sign the contract when the remedy for OU-2A Site 24 based upon Alternative 10B' is selected in a ROD and concurred pursuant to the MCAS El Toro Federal Facility Agreement. The proposed contract provides that it will remain in effect until the regulatory agencies concur that the requirements of the ROD have been met.

Table 4 – Groundwater Remedial Alternatives – Comparative Cost Estimate Summary

Cost Category

Estimated Cost in Millions \$

	Operable Unit 1 Site 18 Alternatives 40 years of estimated operation (shallow groundwater unit) 40 years of estimated operation (principal aquifer)						Operable Unit 2A Site 24 Alternatives 20 years of estimated operation (shallow groundwater unit) 40 years of estimated operation (principal aquifer)				Preferred Remedy Sites 18 & 24 Alternative 8A (principal aquifer) Alternative 10B' (shallow groundwater unit)	
	Alt.2A	Alt.6A	Alt.7A	Alt.7B	Alt.8	Alt. 8A	Alt.9	Alt.10A	Alt.10B'	Alt.11		
Capital Costs	29.9	21.3 ^(a)	18.0	25.9	17.1 ^(a)	16.2	23.6	20.0	21.5	14.2		14.8 ^(b)
<i>Includes design and construction of groundwater treatment and distribution systems that pertain to the VOC-related groundwater contamination.</i>												
Operation, Maintenance and Monitoring Costs	26.5	19.0 ^(a)	16.0	22.3	15.2 ^(a)	17.5	18.1	26.2	26.1	9.6		15.9 ^(b)
<i>Includes operating and maintaining groundwater treatment and distribution systems that pertain to the VOC-related groundwater contamination.</i>												
Total – Present Worth Costs^(c)	56.4	40.3 ^(a)	34.0	48.2	32.3 ^(a)	33.6 ^(d)	41.7	46.2	47.6	23.8		30.6 ^{(b)(d)}

Covers all costs to complete VOC portions of groundwater and treatment systems and includes a contingency to cover cost increases that may occur as a result of unforeseen conditions. Total present worth costs for each alternative include cleanup of both the shallow groundwater unit and principal aquifer.

Detailed information on estimated costs is presented in the Feasibility Studies. The settlement agreement contains costs associated with the preferred remedy.

Notes:

- (a) Figure represents the United States payment for 100% of the VOC treatment requirements associated with the IDP and a portion of the dual-purpose IDP components such as extraction and conveyance requirements.
- (b) The cost of the preferred alternative is based on actual costs contained in the settlement agreement and in the contract for treatment of groundwater from the shallow groundwater unit. The cost assumes 20 years of operation in the shallow groundwater unit and 40 years in the principal aquifer.
- (c) Present worth costs for Sites 18 and 24 alternatives are taken directly from the OU-1 IAFS and the Site 24 FS and are expressed in 1995 and 1997 dollars, respectively. These costs are presented for comparison purposes only.
- (d) Total number is rounded off.

Evaluation of the Preferred Remedy

Each alternative has undergone detailed evaluation and analysis, using evaluation criteria developed by the U.S. EPA. The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. The threshold criteria must be satisfied in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among alternatives. Generally, the modifying criteria are taken into account after public comment is received on the Proposed Plan and reviewed with the various State regulatory agencies to determine if the preferred alternatives remain as the most appropriate remedial action. The nine criteria are defined below and are accompanied by the key points from the evaluation of the preferred remedy. The preferred remedy is a combination of Alternative 8A for the principal aquifer and Alternative 10B' for the shallow groundwater unit. A chart that summarizes evaluation of the groundwater alternatives is shown on page 19. The locations of where to view the feasibility studies and other reports that provide a more detailed explanation of the evaluation of alternatives are found on page 22.

A. Threshold Criteria

1. Overall Protection of Human Health and the Environment – assesses whether a cleanup remedy provides adequate public health protection and describes how health risks posed by the site will be eliminated, reduced, or controlled through treatment, engineering controls, or institutional and regulatory controls.

- The preferred alternative provides short-term protection through institutional controls that prevent the use of contaminated groundwater and long-term protection by removing VOCs and remediating the aquifer to water quality standards for VOCs.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) – addresses whether a cleanup remedy will meet all federal, state, and local environmental statutes or requirements (see page 21).

- VOC-contaminated water will be treated at a minimum to meet water quality standards.
- Emission controls will be used to ensure compliance with air quality standards.

B. Primary Balancing Criteria

3. Long-Term Effectiveness and Permanence – refers to the ability of a remedy to continue protecting human health and the environment over time after the cleanup action is completed.

- Extraction and treatment of groundwater using **air stripping** is a proven, effective technique for removing VOCs and remediating groundwater (air forced through water releases VOCs).

- Requires some treatment of residual wastes (used carbon, filters), generally through regeneration or disposal.

4. Reduction of Toxicity, Mobility, and Volume – refers to the degree to which a cleanup alternative uses treatment technologies to reduce: 1) harmful effects to human health and the environment (toxicity), 2) the contaminant's ability to move (mobility), and 3) the amount of contamination (volume).

- Significantly reduces toxicity and volume through treatment.
- Shallow groundwater unit extraction wells placed within the TCE hot spot remove VOC mass more effectively than wells placed at the leading edge of the plume.

- Computer modeling indicates that the leading edge of the plume will be contained east of Culver Drive in Irvine and that the plume will not impact extraction wells associated with the potable water system. This will be confirmed by groundwater monitoring.

- Removal and treatment of VOCs produces few by-products.

5. Short-Term Effectiveness – assesses how well human health and the environment will be protected from impacts due to construction and implementation of a remedy. Also considers time to reach cleanup goals.

- Does not present substantive risks to on-Station workers or the community; potential for some dust generation during well installation.

- Potential air emissions are easily controlled through activated carbon adsorption.

- Removes most of the mass in the first 20 years.

6. Implementability – refers to the technical feasibility (how difficult the alternative is to construct and operate) and administrative feasibility (coordination with other agencies) of a remedy. Factors such as availability of materials and services needed are considered.

- Technology is readily available.

- Successful pilot tests demonstrate feasibility of extracting and treating contaminated groundwater.

- Allows evaluation of monitored natural attenuation if the IDP is permanently terminated for any reason by OCWD/IRWD.

- Treatment and reuse of groundwater is technically feasible.

7. Cost – evaluates the estimated capital costs and present worth in today's dollars required for design and construction and long-term operation and maintenance costs of a remedy.

- \$30.6 million, includes capital costs, operation and maintenance costs, and monitoring costs (see Table 4 on page 17).

- Saves the government money because the Marine Corps does not need to dispose of the treated groundwater.

- Treatment of VOCs at the IDP is less costly than on-Station treatment and disposal.

- If the IDP is permanently terminated, allows for evaluation of monitored natural attenuation before a replacement treatment system is considered.

C. Modifying Criteria

8. State Acceptance – reflects whether the State of California's environmental agencies agree with, oppose, or have no objection to or comment on the Marine Corps' preferred alternative.

- The State of California concurs with Marine Corps' preferred remedy for groundwater.

9. Community Acceptance – evaluates whether community concerns are addressed by the remedy and if the community has a preference for a remedy. Although public comment is an im-

portant part of the final decision, the Marine Corps is compelled by law to balance community concerns with the other criteria.

■ MCAS El Toro community-based Restoration Advisory Board has had the opportunity to review and comment on the OU-1 and OU-2A Remedial Investigation and Feasibility Study (RI/FS) Reports.

■ Proposed Plan and Draft Final RI/FS Reports are currently available for public comment.

■ Public comment on this Proposed Plan and the Draft Final RI/FS Reports will be reviewed and considered during the preparation of the Record of Decision.

Table 5 – Comparative Analysis of Remedial Alternatives*

U.S. EPA Criteria	No Action 1	Site 18 Alternatives						Site 24 Alternatives				Preferred Remedy 8A/ 10B'
		2A	6A	7A	7B	8	8A	9	10A	10B	11	
1 Overall Protection of Human Health and the Environment	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 Compliance with Applicable or Relevant and Appropriate Requirements	N/A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3 Long-Term Effectiveness and Permanence	○	●	●	●	●	●	●	●	●	●	●	●
4 Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment	○	●	●	●	●	●	●	●	●	●	●	●
5 Short-Term Effectiveness	○	●	●	●	●	●	●+	●	●	●	●	●
6 Implementability	●	●	NAF	●	●	NAF	●	●	NAF	●	●	●
7 Cost	●	○	●	●	●	●	●	●	●	●	●	●
8 State Acceptance – State concurs with the preferred remedy.												●
9 Community Acceptance – This criteria will be addressed in the Record of Decision.												

X – does not meet criteria ✓ – meets criteria N/A – not applicable

NAF – not administratively feasible

* In this analysis, remedial alternatives for each site are only evaluated against each other. Thus, Site 18 Alternatives are not to be compared with Site 24 Alternatives.

+ By further optimizing the placement of extraction wells in the remedial design phase, remediation time may be significantly shortened.

Relative Performance in Satisfying Criteria

○ Least Acceptable Performance ● Fair Performance ● Moderate Performance ● Good Performance

Rationale for the Marine Corps' Preferred Remedy for Groundwater Cleanup

The Marine Corps prefers Alternative 8A and Alternative 10B' for remediation of groundwater at Sites 18 and 24 for several reasons, including cost-effectiveness, implementability, and anticipated community acceptance.

The preferred remedy is cost effective. The cost of combined Alternative 8A/10B' is lower than the cost of any other alternatives that actively remediate the principal aquifer. The Marine Corps' costs are reduced because they do not need to pay to dispose of treated groundwater.

The preferred remedy is readily implemented. The technology that will be used to remediate groundwater is proven and readily available. In addition, the OCWD/IRWD are prepared to proceed once the preferred groundwater remedy is selected and finalized in the ROD.

Finally, the Marine Corps anticipates a higher level of community acceptance for the preferred remedy because these alternatives restore and make beneficial use of scarce groundwater resources. The preferred remedy also uses separate treatment systems for groundwater from contaminated and uncontaminated areas and does not reuse previously contaminated groundwater for potable purposes. Community acceptance will be evaluated following the public comment period (see page 20).

Status of Installation Restoration Program Activities

Remediation of contaminated groundwater associated with Installation Restoration Program (IRP) Operable Unit 1 Site 18 (off-Station regional groundwater) and Operable Unit 2A Site 24 (on- and off-Station shallow groundwater) represents a key component of the comprehensive environmental investigation and cleanup program underway at MCAS El Toro. Designed to protect public health and the environment, the IRP provides a structure for the Marine Corps to identify, investigate, and implement remedies for contamination that resulted from past operations and waste disposal activities. This effort is being coordinated with the operational closure of the Station that took place in July 1999. The IRP process for Operable Unit 1 Site 18 and Operable Unit 2A Site 24, is shown below.

To effectively manage the overall cleanup effort, the Marine Corps organized the IRP sites into Operable Units or OUs.

- OU-1 (Site 18) addresses the VOC contamination in the regional groundwater that extends 3 miles west of the Station.
- OU-2A includes VOC-contaminated soil and groundwater at Site 24, the VOC Source Area; and Site 25, the Major Drainage Channels at the Station.
- OU-2B (Sites 2 and 17) and OU-2C (Sites 3 and 5) address inactive landfill sites that contain a variety of waste materials.
- OU-3 includes the remaining IRP sites at the Station.

In 1997, the Marine Corps issued Proposed Plans and established public comment periods for: the Site 24 VOC Source Area for soil cleanup using soil vapor extraction technology; and for the Marine Corps' recommendation for No Further Action for OU-3 Sites 4, 6, 9, 10, 13, 15, 19, 20, 21, 22, and OU-2A Site 25. After consideration of public comments on the proposed alternatives, an Interim Record of Decision (ROD) formally documenting the remedial actions planned for soil at Site 24 and a ROD for these other sites were both finalized in September 1997. The Final ROD for soil at Site 24 will be developed in 2002.

In May 1998, the Marine Corps issued a Proposed Plan and established a public comment period for the OU-2B and OU-2C (landfill) sites. In July 2000, an Interim ROD for Sites 2 and 17 was finalized. Completion of the ROD process for closure of the landfills (Sites 2 and 17 and Sites 3 and 5) is anticipated to occur in 2001.

In May 1999, the Marine Corps issued a Proposed Plan for Sites 8, 11, and 12. Based on agency and public comments, only Site 11 was included in the ROD that was finalized in September 1999. Completion of the ROD process for Sites 8 and 12 is expected to occur in 2001.

A ROD documenting a no action decision for Sites 7 and 14 was finalized in June 2001. A ROD documenting the selected remedial action for Site 16 is expected to be finalized in 2002.

What Happens After the Public Comment Period?

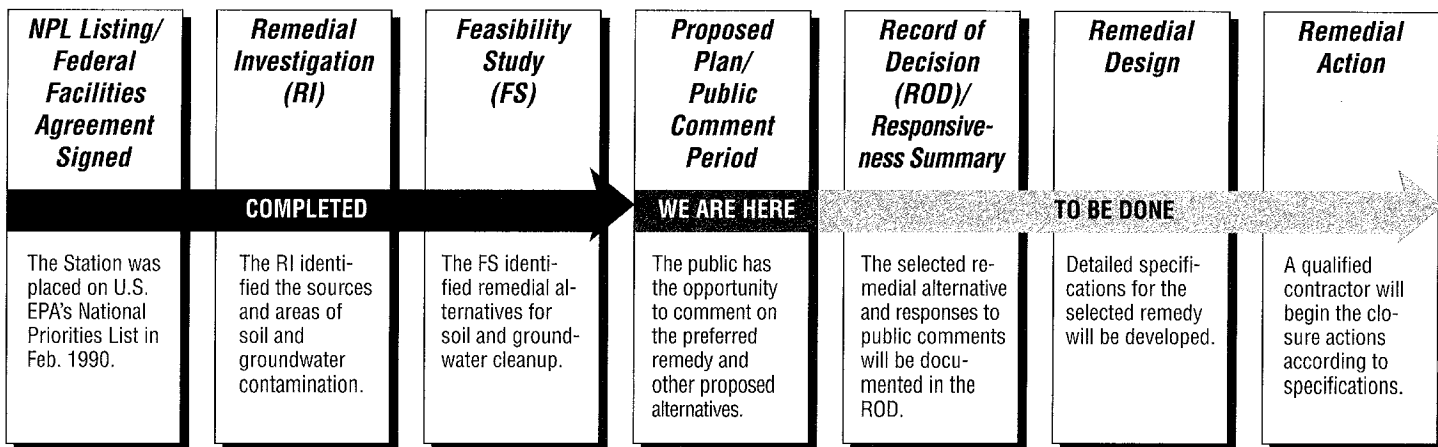
After the close of the 30-day public comment period (November 7–December 7, 2001) for the OU-1 and OU-2A Proposed Plan, the next steps in the Installation Restoration Program process are the Record of Decision/Responsiveness Summary and Remedial Design/Remedial Action.

The ROD formally documents the selection of the final remedial alternative for groundwater at Sites 18 and 24. Comments received in writing or verbally provided to the court reporter at the public meeting held on November 13, 2001 are documented and responded to in the Responsiveness Summary portion of the ROD. The Marine Corps will consider com-

ments received from the public in the final selection of a remedial alternative.

Remedial design involves developing detailed designs and specifications for the selected remedy. Implementation of the preferred remedy would involve coordination of the Marine Corps, the regulatory agencies, and the Orange County Water District and Irvine Ranch Water District during the design phase. **Remedial action** refers to the construction, testing, and operation of the groundwater treatment system and requires similar cooperation between these agencies. If another alternative were selected, roles of the various agencies would be determined by the scope of that alternative.

MCAS El Toro Installation Restoration Program Process Groundwater Remediation – OU-1 and OU-2A



Applicable or Relevant and Appropriate Requirements for Remediation of VOC Contamination at OU-1 and OU-2A

The federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) states that remedial actions at sites listed on the National Priorities List must meet federal or state (if more stringent) environmental standards, requirements, criteria, or limitations that are determined to be legal applicable or relevant and appropriate requirements (ARARs). MCAS El Toro was listed on the National Priorities List in 1990. The intent of meeting ARARs is to select and implement cleanup or remedial actions that are protective of human health and the environment in accordance with regulatory requirements. Requirements of potential ARARs are divided into three categories:

■ **Chemical-specific** – are health- or risk-based numerical values for various environmental media, specified in federal or state statutes or regulations.

■ **Location-specific** – addresses regulations that may require actions to preserve or protect aspects of environmental or cultural resources that may be threatened by remedial actions to be undertaken at the site.

■ **Action-specific** – are regulations that apply to specific activities or technologies used to remediate a site, including design criteria and performance requirements.

Potential ARARs that will be met by the preferred remedy (Alternatives 8A and 10B') for cleanup of VOC-contaminated groundwater at OU-1 (regional groundwater) and OU-2A (Site 24) at MCAS El Toro are listed below.

U.S. Environmental Protection Agency (U.S. EPA)

Substantive requirements of the following provisions of Title 40 of the Code of Federal Regulations pertaining to maximum contaminant levels (MCLs) and nonzero MCL goals for VOCs have been determined to be Federal ARARs:

- Section 141.61;
- Section 141.50 (Subpart F).

Substantive requirements of the following provisions of Title 22 of the California Code of Regulations (CCR) have been determined to be Federal ARARs:

- Determination of hazardous waste [Section 66261.24(a)(1)];
- System construction within 100-year floodplain [Section 66264.18(b)];
- Onsite waste generation [Sections 66262.10(a) and 66262.11]; and
- Pretransport requirements for hazardous waste [Sections 66262.30, 66262.31, 66262.32, 66262.33 and 66262.34].
- Groundwater monitoring [Sections 66264.93, 66264.97(b) and (e)(1)-(5), 66264.98, 66264.99, 66264.100 (a), (b), (c), (d), (f), and (g)(1)].
- Groundwater protection standards of MCLs for VOCs as determined under Section 66264.94 (except for 66264.94 (a)(2) and 66264.94 (b)); [Note: The Santa Ana Regional Water Quality Control Board (RWQCB) identified State Water Resources Control Board (SWRCB) Res. No. 92-49 as a groundwater and vadose zone protection standard. The Marine Corps does not agree with the RWQCB because SWRCB Res. No. 92-49 is no more stringent than Title 22 CCR Section 66264.94. However, because the standards are identical in these two regulations and the proposed remedy complies with the standards in both regulations, the RWQCB concurs with the proposed remedy while reserving its legal position.]
- While it is the Marine Corps' position that the designation of a point of compliance for the groundwater protection standard for VOCs at the downgradient edge of the VOC source area in Site 24 pursuant to Title 22 CCR 66264.95 would be appropriate and is supported by CERCLA, the

NCP, and the Administrative Record for Sites 18 and 24, the Marine Corps agrees to comply with the groundwater protection standard throughout the VOC plume and does not intend to designate a point of compliance at this time, reserving its right to do so at a later time.

- The substantive requirements of Title 36 Code of Federal Regulations (CFR) Part 65; 40 CFR Section 6.301(c); and 16 USC Section 469 [National Archaeological and Historical Preservation Act] have been determined to be Federal location-specific ARARs. Further evaluations of compliance with these requirements will be conducted when exact locations of wells are identified during engineering design work.
- The substantive requirements of 40 CFR Part 6, Appendix A, excluding Sections 6(a)(2), 6(a)(4), 6(a)(6); and 40 CFR Section 6.302(b) have been determined to be Federal location-specific ARARs [system construction within a floodplain].

The California EPA Department of Toxic Substances Control (DTSC)

The substantive requirements of the following provisions of Title 22 CCR have been determined to be State chemical-specific ARARs:

- Hazardous waste determinations [Sections 66261.22(a)(3) and (4), 66261.24(a)(2) to (a)(8), 66261.101, 66261.3(a)(2)(C), or 66261.3(a)(2)(F)]; and
- State MCL listings for organic chemicals [Section 64444(a)].

The following requirements of the California Civil Code and the California Health and Safety Code (HSC) have been determined to be state action-specific ARARs for implementation of institutional controls for on-Station property that will be transferred to a non-federal entity:

- California Civil Code Section 1471, Transfer of Obligations;
- HSC Sections 25202.5; 25222.1; and 25233(c).

In addition, on March 16, 2000, DON and DTSC executed a memorandum of agreement that formalizes the Environmental Restriction Covenant that will contain environmental restrictions and serve as a mechanism to implement institutional control use restrictions set forth in the OU-1/OU-2A ROD in accordance with DON policy.

The California Regional Water Quality Control Board— Santa Ana Region (RWQCB)

Substantive provisions of the following requirements have been determined to be State ARARs:

- Comprehensive Water Quality Control Plan (CWQCP) for the Santa Ana River Basin, 1995, Chapters 2 through 4;
- The substantive provisions of Water Code Section 13240 as implemented through the beneficial use designations and VOC water quality objectives in the CWQCP for the Santa Ana River Basin, 1995;
- State Water Resources Control Board (SWRCB) Resolution No. 88-63; and
- California Water Code, Division 7, Sections 13241, 13243, 13263(a), 13269, and 13360 (Porter-Cologne Water Quality Act);
- The Santa Ana RWQCB identified the substantive provisions of the "Statement of Policy with Respect to Maintaining High Quality Waters in California" (SWRCB Res. No. 68-16) as a State ARAR and interprets it as prohibiting further migration of the VOC contaminant plume in Site 18; the USEPA and the Marine Corps do not agree that SWRCB Res. No. 68-16 applies to further migration; however, the Santa Ana RWQCB concurs with the proposed remedy and agrees that the preferred remedy will comply with their interpretation of SWRCB Res. No. 68-16 because the MCL line of the VOC plume will not move significantly past its current location; and
- Groundwater monitoring [California Code of Regulations, 27 CCR 20415 (e)(12)(B)].

South Coast Air Quality Management District (SCAQMD)

The substantive requirements of the following SCAQMD rules have been determined to be ARARs as discussed below:

- SCAQMD Rule 1303 [discharges to air] has been determined to be a Federal ARAR because the U.S. EPA approved this rule as a component of the State Implementation Plan (SIP) in accordance with 40 USC Section 7410 and portions of 40 CFR Section 52.220 [Clean Air Act]; and
- SCAQMD Rule 1401 [treatment requirements for discharges to air] is a State ARAR because it is not included in the SIP.

Reports and Documents Available for Review and Comment

The collection of reports and documents used by the Marine Corps in the selection of cleanup or environmental management alternatives is referred to as the Administrative Record (AR). A site-specific AR file has been compiled for Operable Unit 1 Site 18 and Operable Unit 2A Site 24 discussed in this Proposed Plan. Key documents include: the Phase I Remedial Investigation Draft Technical Memorandum (May 1993); Draft Final Operable Unit 1 Interim Remedial Investigation/Feasibility Study (RI/FS) Report, Nine Volumes (August 1996); Draft Final Phase II Remedial Investigation Report, Operable Unit 2A, Site 24, Four Volumes (March 1997); the Draft Final Phase II Feasibility Study Report, Operable Unit 2A, Site 24 (December 1997); Technical Memorandum; the Evaluation of OU-1 Alternative 8A with Respect to Nine NCP Criteria (October 2001); and the Draft Site Closure Report, Vadose Zone Remediation, IRP Site 24 (June 2001). Documents that pertain to groundwater remediation pilot tests include: Draft Final Groundwater Remediation Pilot Test Work Plan (July 1997) and Draft Groundwater Remediation Pilot Test Report (November 1998).

The RI/FS reports, the signed settlement agreement, other relevant documents that pertain to these sites, and a complete index of all MCAS El Toro documents are housed in the Information Repository at the Heritage Park Regional Library, 14361 Yale Avenue in Irvine, (949) 551-7151.

The complete collection of documents listed in the AR index is also available for review at MCAS El Toro. To schedule a time to review documents at the Station during the public comment period, contact Dean Gould at (949) 726-5398 or (619) 532-0784.

Where to Get More Information

Copies of Remedial Investigation and Feasibility Studies Reports, including the human health risk assessments and other key documents relating to environmental activities at MCAS El Toro, are available for public review at this Information Repository: **Heritage Park Regional Library, 14361 Yale Avenue, Irvine, California 92714; (949) 551-7151**. Current hours of operation: Monday – Thursday 10 a.m. to 9 p.m.; Friday – Saturday 10 a.m. to 5 p.m.; and Sunday 12 p.m. to 5 p.m.

The Marine Corps encourages community involvement in the decision-making process of the environmental restoration program at MCAS El Toro. If you have any questions or concerns about environmental activities at the Station, please feel free to contact any of the following project representatives:

Mr. Dean Gould

BRAC Environmental Coordinator
Base Realignment and Closure
MCAS El Toro
P.O. Box 51718
Irvine, CA 92619-1718
(949) 726-5398 or (619) 532-0784

Ms. Viola Cooper

Community Involvement
Coordinator
Superfund Division
U.S. EPA
75 Hawthorne St. (SFD-3)
San Francisco, CA 94105
(800) 231-3075
(415) 744-2188

Ms. Kim Foreman

Public Participation Specialist
California EPA
Department of Toxic
Substances Control
5796 Corporate Ave.
Cypress, CA 90630
(714) 484-5324

Glossary of Technical Terms

Air Stripping: A treatment technology that transforms VOCs in groundwater to gas for removal and treatment.

Aquifer: A particular zone or layer of rock or soil below the earth's surface through which groundwater moves in sufficient quantity to serve as a source of water.

Cleanup Goals: Chemical concentration levels that are the goals of the remedial action. Once the cleanup goals have been achieved, the remedy is considered protective of human health and the environment.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Commonly known as the Superfund. This law authorizes EPA to respond to past hazardous waste problems that may endanger public health and the environment. CERCLA was authorized and amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Domestic Use: Use of water for drinking, cooking, and bathing.

Downgradient: Groundwater that is downstream of an area of soil or groundwater contamination.

Extraction Wells: Wells used to pump groundwater to the surface for treatment or for use.

Feasibility Study (FS): An analysis of cleanup or remedial alternatives to evaluate their effectiveness and to enable selection of a preferred alternative.

Federal Facility Agreement: A voluntary agreement entered into by the Navy, U.S. EPA, and Cal-EPA (Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB)) establishing an overall framework for how the investigation and cleanup of MCAS El Toro is to be conducted.

Groundwater: Underground water that fills pores in soil or openings in rocks.

Infiltration: Process by which dissolved chemical constituents are carried by water through the soil.

Intermediate Zone: A generally low permeability layer that separates that shallow groundwater unit from the principal aquifer at MCAS El Toro.

Maximum Contaminant Levels (MCLs): The maximum permissible level of a contaminant in water delivered to any user of a public water system. MCLs are enforceable standards.

Maximum Contaminant Level Goal: A non-enforceable concentration of a drinking-water contaminant, set at a level at which no known adverse effects on human health occur.

Monitored Natural Attenuation: Refers to the routine sampling and testing of groundwater to assess the cleanup effectiveness of natural attenuation processes.

Monitoring Well: Wells drilled at specific locations either on or near a hazardous waste site, for the purpose of determining direction of groundwater flow, types and concentrations of contaminants present, or vertical or horizontal extent of contamination.

Natural Attenuation: The process by which a compound is reduced in concentration over time, through adsorption, degradation, dilution, and/or transformation.

Nitrates: Compounds containing nitrogen which dissolve in water and may have harmful effects on humans and animals. Nitrates are commonly used in fertilizers.

Operable Unit (OU): Term for each of a number of separate activities undertaken as part of a Superfund site cleanup.

Plume: A three-dimensional zone within the groundwater aquifer containing contaminants that generally move in the direction of, and with, groundwater flow.

Principal Aquifer: The main (regional) water-bearing aquifer in the vicinity of MCAS El Toro.

Rebound: The tendency of soil gas concentrations to increase after SVE is turned off.

Record of Decision (ROD): A public document that explains what cleanup alternative will be used at a specific NPL site. The ROD is based on information and technical analysis generated during the remedial investigation/feasibility study and consideration of public comments and community concerns.

Remedial Action (RA): The actual construction or implementation phase that follows the remedial design of the selected cleanup alternative at a Superfund site.

Remedial Design (RD): The design of the selected cleanup alternative for a Superfund site.

Remedial Investigation (RI): One of the two major studies that must be completed before a decision can be made about how to clean up a Superfund site. (The FS is the second major study.) The RI is designed to determine the nature and extent of contamination at the site.

Shallow Groundwater Unit: The shallowest water-bearing zone beneath MCAS El Toro.

Soil Gas: Gas found in soil pore space. In contaminated areas, soil gas may include VOCs.

Soil Vapor Extraction (SVE): A process whereby contaminated soil gas is brought to the surface for treatment.

Trichloroethene (TCE): A volatile organic compound that has been widely used as an industrial solvent. TCE is a colorless, odorless liquid that, when inhaled or ingested in large amounts, can cause irritation of the nose, throat, and eyes, nausea, blurry vision, or dermatitis. EPA has classified TCE as a "probable human carcinogen."

Total Dissolved Solids (TDS): Used to reflect salinity of groundwater.

Upgradient: Groundwater that is upstream of an area of soil or groundwater contamination.

Volatile Organic Compound (VOC): An organic (carbon containing) compound that evaporates readily at room temperature. VOCs are commonly used in dry cleaning, metal plating, and machinery degreasing operations.

Water Quality Standards: State-adopted and U.S. EPA-approved ambient standards for water bodies. The standards cover the use of the water body and the water quality criteria which must be met to protect the designated use or uses.

MAILING LIST COUPON

If you would like to be on the mailing list to receive information about environmental restoration activities at MCAS El Toro, please complete the coupon below and mail to: Base Realignment and Closure, Attn: Dean Gould, Base Realignment and Closure Environmental Coordinator, MCAS El Toro, P.O. Box 51718, Irvine, CA 92619-1718.

- ☐ Add me to the MCAS El Toro Installation Restoration Program mailing list.
☐ Send me information on Restoration Advisory Board membership.

Name _____

Street _____

City _____ State _____ Zip Code _____

Affiliation (optional) _____ Telephone _____

Base Realignment and Closure
Attn: Mr. Dean Gould
BRAC Environmental Coordinator
MCAS El Toro
P.O. Box 51718
Irvine, CA 92619-1718

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MCAS EL TORO - PUBLIC COMMENT FORM
PROPOSED PLAN - GROUNDWATER CLEANUP
Operable Unit 1/Site 18 & Operable Unit 2A/Site 24

USE THIS FORM TO WRITE YOUR COMMENTS

Date: _____

(Attach additional pages if you need more space.)

Name: _____

Affiliation: _____

Address: _____

City: _____

State: _____ **Zip Code:** _____

Telephone: () _____

Mail written comments **postmarked no later than December 7, 2001** to: Mr. Dean Gould, Base Realignment and Closure (BRAC) Environmental Coordinator, Environmental Division, MCAS El Toro, P.O. Box 51718, Irvine, CA 92619-1718. Comments may also be faxed to (949) 726-6586 or sent via e-mail to GouldDA@efdswnavfac.navy.mil **no later than December 7, 2001.**

**MCAS EL TORO
RAB MEETING**

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE
November 28, 2001**

Presented By
Crispin Wanyoike
Earth Tech Inc.

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

• **BACKGROUND**

Site 2 – Magazine Road Landfill

- Located between tributaries of the Borrego Canyon Wash
- Approximately 27 acres
- Used as the Station landfill from the 1950s to 1980

Site 17 – Communication Station Landfill

- Located in a small canyon west of the Magazine Road Landfill
- Approximately 11 acres
- Used from 1970 to 1986

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

• **SELECTED REMEDY**

- Onsite waste consolidation
- Landfill Cap System
 - Soil cover (minimum 4 feet thick) to minimize and prevent contact with landfill materials and to reduce infiltration into the waste
 - Erosion control features to protect the integrity of the cover system
- Fencing and signage to restrict access
- Land-use restrictions to protect landfill cover system and restrict irrigation
- Natural resource/habitat mitigation for the California Gnatcatcher to be coordinated with the U.S. Fish and Wildlife Service

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

• **REMEDIAL DESIGN SCHEDULE**

- Final Interim ROD signed July 2000
- 30 % Design Submittal - February 2, 2001
- 60 % Design Submittal – November 2001
- 90 % Design Submittal – February 2002
- Final Design - May 2002
- Remedial Action Construction – June 2002 – January 2003

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

- **60 % REMEDIAL DESIGN OVERVIEW**
 - 60 % Design defines how the Remedial Design will be completed in accordance with the Final Interim ROD
 - 60 % Design consists of the following:
 - Basis of Design Report
 - Engineering Plans
 - Hydraulics and Hydrology Report
 - Technical Memorandum presenting results of the Pre-Design Investigation
 - Responses to comments received on the 30 % Design

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

- **DESIGN REVIEW AND COORDINATION**
 - BCT Review Comments
 - Use of maximum credible earthquake as Seismic Design Criteria
 - Supplemental Geotechnical Investigation required to better estimate the effects of a maximum credible earthquake
 - Alton Parkway Extension Coordination with County
 - Four design coordination meetings conducted
 - Site visit conducted February 2001
 - Last meeting conducted November, 2001
 - Next meeting scheduled for March 2002

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

- **DESIGN REVIEW AND COORDINATION**

- Section 7 Consultation with USFWS
 - Site visit conducted in December 2000
 - Biological Assessment being prepared
 - USFWS Biological Opinion anticipated in April 2002

**IRP SITE 2 AND 17
REMEDIAL DESIGN UPDATE**

- **90 % REMEDIAL DESIGN SUBMITTAL**

- Basis of Design Report
- Detailed Plans and Specifications
- Hydraulics and Hydrology Report
- Geotechnical Evaluation (incorporating supplemental investigation results)
- Technical Memorandum presenting results of the Pre-Design Investigation
- Responses to comments received on the 60 % Design
- Construction Quality Control and Assurance Plan
- Contingency Plan

MCAS EL TORO RAB MEETING

IRP Site 1 Remedial Investigation (RI) Ordnance/Explosives (OE) Range Evaluation November 28, 2001

Presented By
Buzz Barton (Project OE Specialist)
Eli Vedagiri (Project Engineer)
EARTH TECH, Inc.

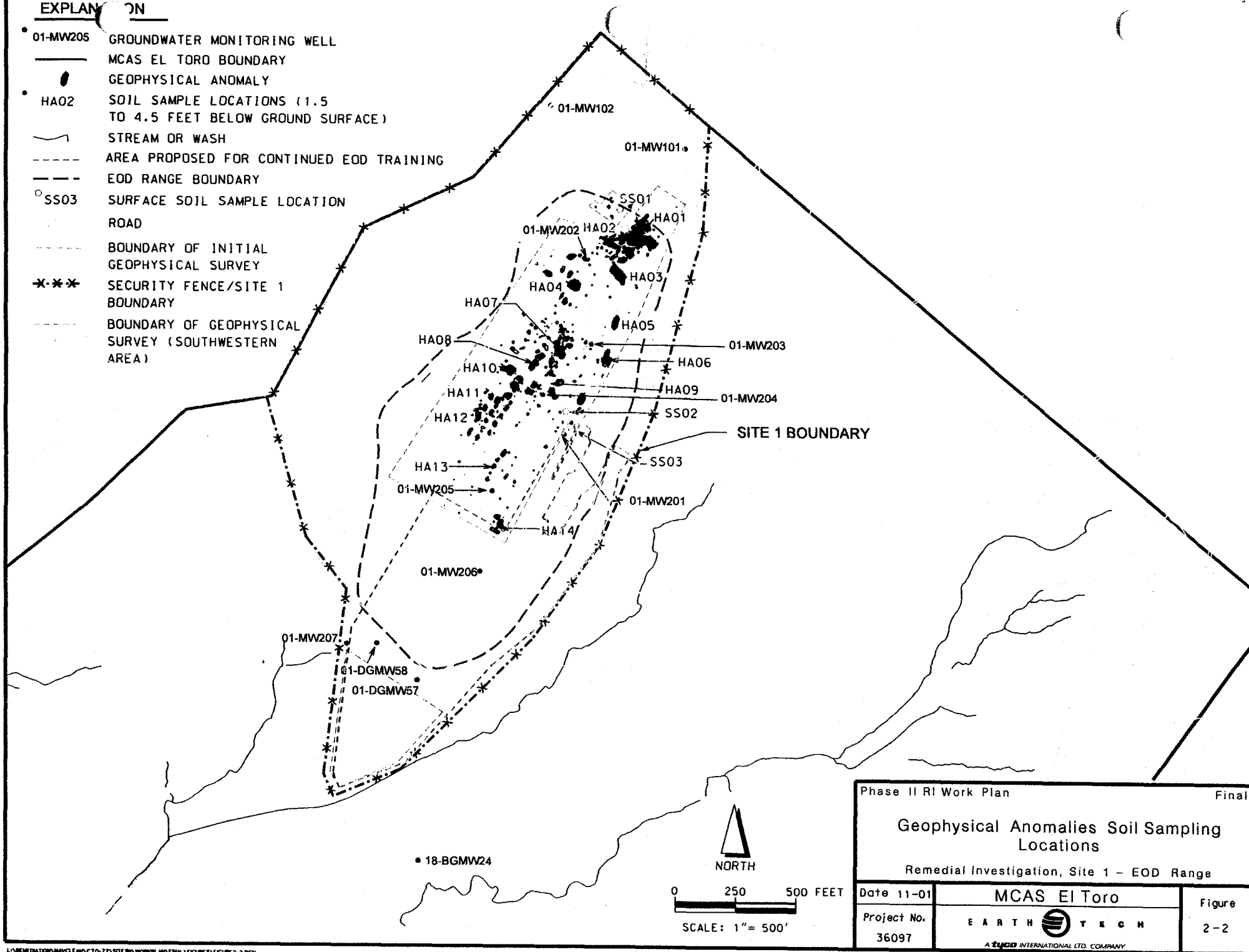
SITE 1 RI & OE RANGE EVALUATION

- **SITE DESCRIPTION/HISTORY**

- Approximately 40 acres with the center portion of the site used for EOD Training
- EOD Training performed at the site for more than 40 years (~1953-1999)
- Munitions used in training activities included:
 - Cartridge-actuated devices and ammunition
 - FS Smoke (sulfur trioxide chlorosulfonic acid)
 - Hand grenades, land mines
- Northern EOD Range used by military
- Southern EOD Range used by FBI and Orange County Law Enforcement
- Currently secured by fence/locked gate

EXPLANATION

- 01-MW205 GROUNDWATER MONITORING WELL
- MCAS EL TORO BOUNDARY
- GEOPHYSICAL ANOMALY
- HA02 SOIL SAMPLE LOCATIONS (1.5 TO 4.5 FEET BELOW GROUND SURFACE)
- STREAM OR WASH
- AREA PROPOSED FOR CONTINUED EOD TRAINING
- EOD RANGE BOUNDARY
- SS03 SURFACE SOIL SAMPLE LOCATION
- ROAD
- BOUNDARY OF INITIAL GEOPHYSICAL SURVEY
- *** SECURITY FENCE/SITE 1 BOUNDARY
- BOUNDARY OF GEOPHYSICAL SURVEY (SOUTHWESTERN AREA)



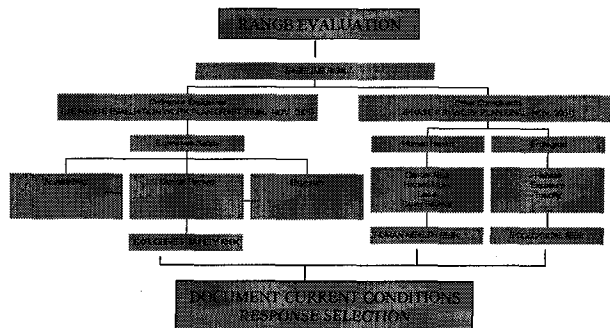
Phase II RI Work Plan		Final
Geophysical Anomalies Soil Sampling Locations		
Remedial Investigation, Site 1 - EOD Range		
Date 11-01	MCAS El Toro	Figure
Project No. 36097	EARTH TECH	2-2
A TUGO INTERNATIONAL LTD. COMPANY		

SITE 1
RI & OE RANGE EVALUATION

- NOTE: Figure 2-2 from RI Work Plan (Geophysical Anomalies Soil Sampling Locations) will be shown here

SITE 1
RI & OE RANGE EVALUATION

Goal: Estimate Baseline Risk to Document Current Conditions and
Evaluate Response Actions



SITE 1
RI & OE RANGE EVALUATION

- **SUMMARY OF ASSESSMENT ACTIVITIES TO DATE**
 - Groundwater Investigation: Perchlorate identified
 - Range Identification and Assessment
 - Close-out Inspection
 - Geophysical Survey of Range areas
 - Biological Habitat Assessment
 - Gnatcatcher (federally threatened species)
 - Riverside fairy shrimp (federally threatened species)
 - Radiological Survey
 - Soil Sampling/Analysis of a 3.3-acre portion in support of transfer

SITE 1
RI & OE RANGE EVALUATION

- **PHASE II RI – FIELD ACTIVITIES**
 - Tier 1
 - Shallow Soil Sampling (Systematic Grid) - Direct Push
 - Groundwater Sampling
 - Tier 2
 - Soil Sampling of Geophysical Anomaly Areas - Trenching
 - Tier 3
 - Deep Soil Sampling (if required) - Drilling
 - Additional Groundwater Wells

SITE 1
RI & OE RANGE EVALUATION

- **OE CHARACTERIZATION – FIELD ACTIVITIES**
 - Northern/Southern EOD Ranges
 - Probability Sampling - 1 Acre Grids
 - Trenching/Potholing of Geophysical Anomalies
 - Buffer Zone (Evaluate Kick-outs)
 - Probability Sampling – Transects
 - Geophysical Survey to identify Anomalies
 - Trenching/Potholing of Anomalies
 - Range Perimeter (Evaluate Kick-outs)
 - Surface Survey using All-Metals Detector
 - Geophysical Survey
 - Trenching/Potholing of Anomalies

SITE 1
RI & OE RANGE EVALUATION

- **OE CHARACTERIZATION – FIELD ACTIVITIES**
 - Removal and Handling of OE Scrap
 - Handling of Unsafe-to-Move OE
 - Blow-In-Place (BIP) with Engineering Controls
 - Handling of Safe-to-Move OE
 - Move to Onsite Consolidation Location
 - Detonate with Engineering Controls
 - Notifications, Evacuation, and Site Control
 - Explosives Accountability

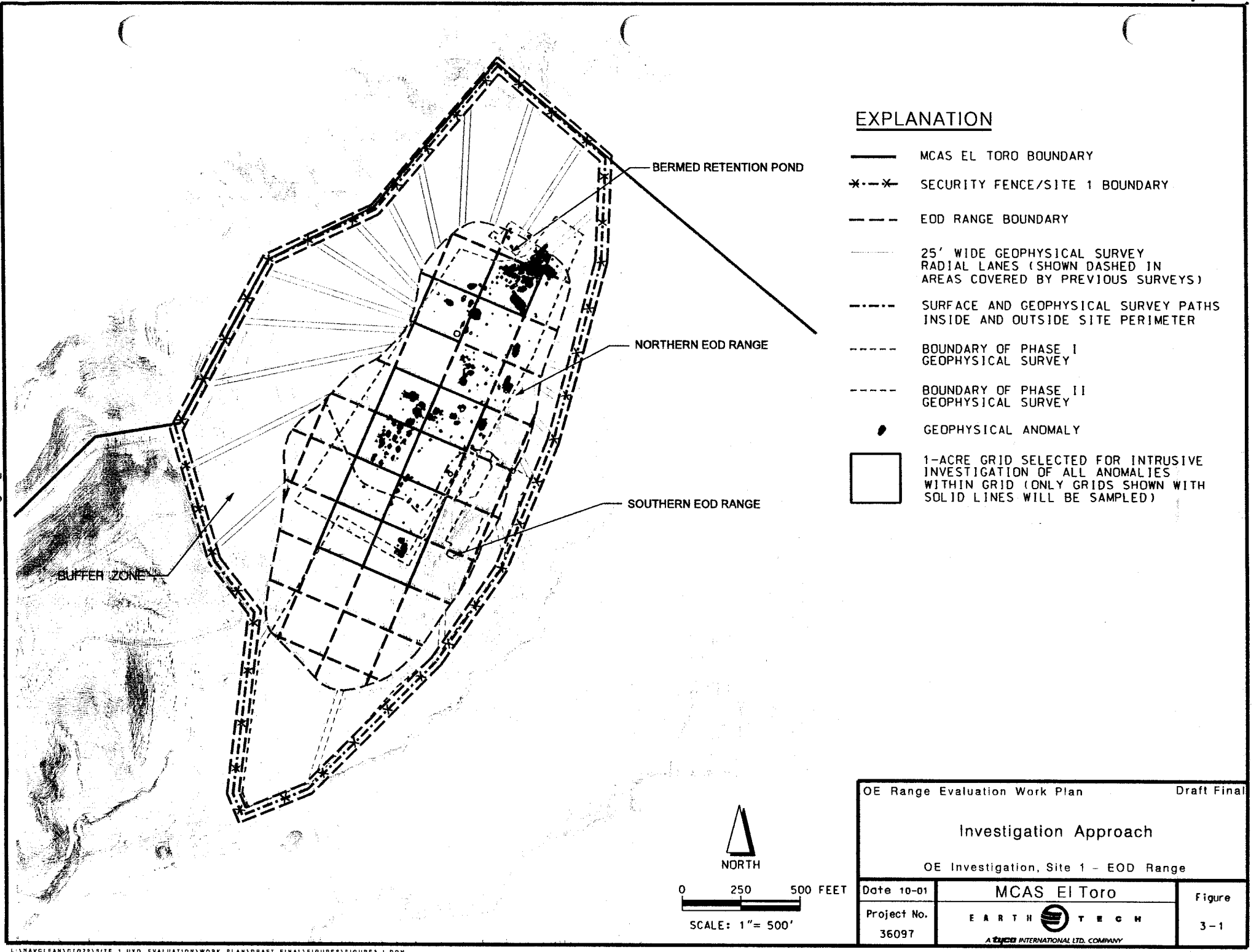
SITE 1
RI & OE RANGE EVALUATION

- NOTE: Figure 3-1 (Investigation Approach) from the OE Range Evaluation Work Plan will be shown here

SITE 1
RI & OE RANGE EVALUATION

- NOTE: Figure 4-2 (Process Flowchart) from the OE Range Evaluation Work Plan will be shown here

3-9



EXPLANATION

- MCAS EL TORO BOUNDARY
- *--* SECURITY FENCE/SITE 1 BOUNDARY
- EOD RANGE BOUNDARY
- 25' WIDE GEOPHYSICAL SURVEY RADIAL LANES (SHOWN DASHED IN AREAS COVERED BY PREVIOUS SURVEYS)
- SURFACE AND GEOPHYSICAL SURVEY PATHS INSIDE AND OUTSIDE SITE PERIMETER
- BOUNDARY OF PHASE I GEOPHYSICAL SURVEY
- BOUNDARY OF PHASE II GEOPHYSICAL SURVEY
- GEOPHYSICAL ANOMALY
- 1-ACRE GRID SELECTED FOR INTRUSIVE INVESTIGATION OF ALL ANOMALIES WITHIN GRID (ONLY GRIDS SHOWN WITH SOLID LINES WILL BE SAMPLED)

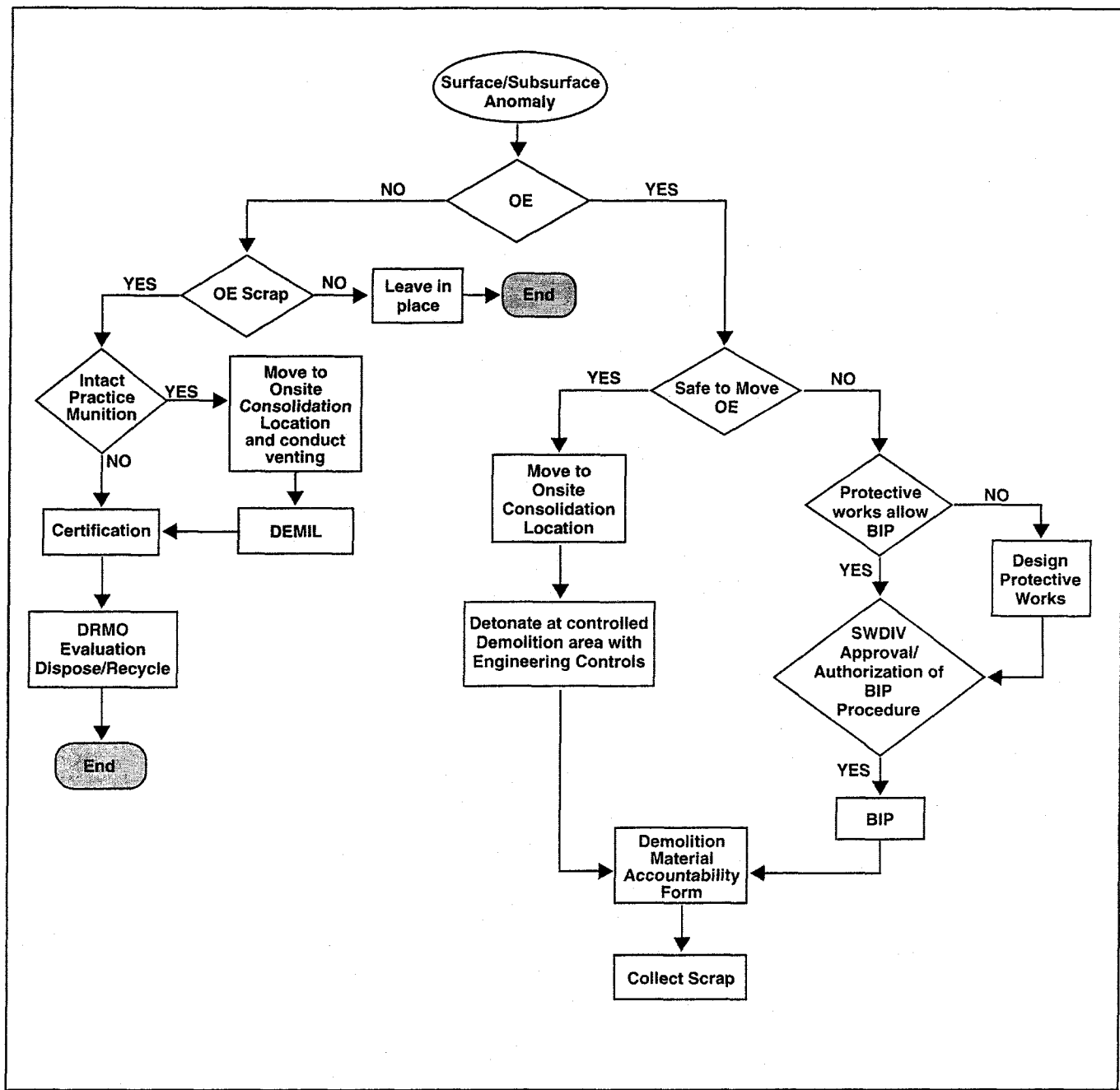


NORTH

0 250 500 FEET

SCALE: 1"= 500'

OE Range Evaluation Work Plan		Draft Final
Investigation Approach		
OE Investigation, Site 1 - EOD Range		
Date 10-01	MCAS El Toro	Figure
Project No. 36097	EARTH TECH	3-1
A TUGGS INTERNATIONAL LTD. COMPANY		



EXPLANATION:

BIP	Blow in Place
OE	Ordnance and Explosives
DEMIL	Demilitarized (to render unusable)
DRMO	Defense Reutilization Marketing Office
SWDIV	Southwest Division, Naval Facilities Engineering Command

OE Range Evaluation Work Plan		Draft Final
Process Flowchart OE Investigation, Site 1-EOD Range		
Date 10-01	MCAS El Toro	
Project No. 36097	EARTH TECH <small>A TETRA INTERNATIONAL LTD. COMPANY</small>	
		Figure 4-2

SITE 1
RI & OE RANGE EVALUATION

- **SCHEDULE**

- Final RI Work Plan – 29 Nov. 2001
- 30-Day Public Comment Period on Draft Final OE Work Plan
 - 3 Nov. – 3 Dec. 2001
- Final OE Work Plan – 31 Dec. 2001

- Field Investigation
 - RI Tier 1 and 2/OE Characterization: 1 – 30 Jan. 2002
 - RI Tier 3: 4 – 27 Mar. 2002

Status of Radiological Survey Evaluation

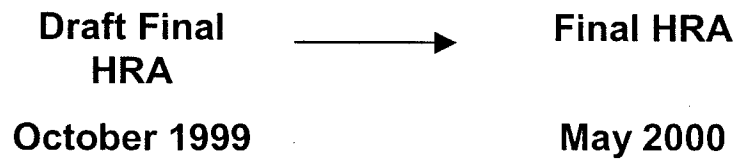
Presentation for the MCAS El Toro Restoration Advisory Board (RAB)

Wednesday, November 28, 2001

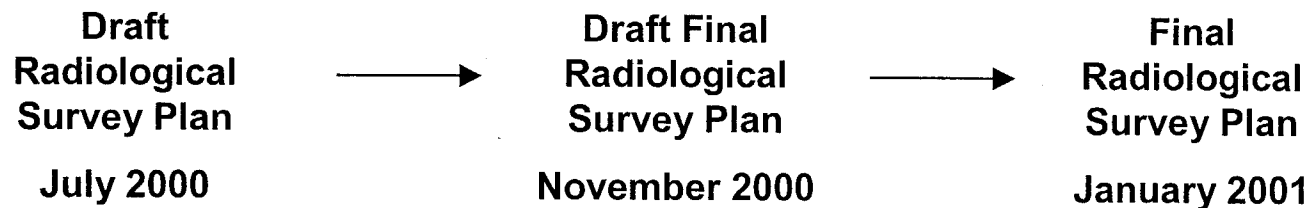
**Presented by Roy F. Weston, Inc.
Mare Island Office
Vallejo, CA**

Radiological Status

Historical Radiological Assessment (HRA):



Radiological Survey Plan :

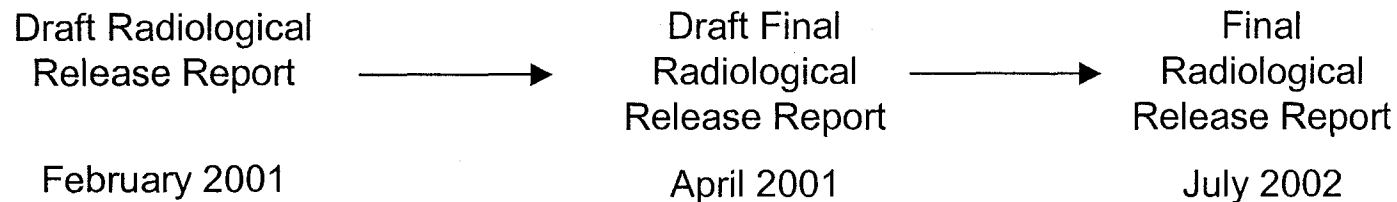


Radiological Status

Perform On-Site Radiological Surveys:



Radiological Release Report*:



***Dates for Release Report are without remediation.**

Radiation Survey Status

Sites Radiologically Surveyed

1. IR Site 3 (Original Landfill)
2. IR Site 5 (Perimeter Road Landfill) including APHO-46
3. IR Site 8 (DRMO Yard 1)
4. AOC-264 (DRMO Yard 3)
5. NBC Complex (Bldgs 787, 1789 and 1803 and APHO-38))
6. Suspected site of former Radium Plaque Adaptometer Bldg.
7. IR Site 12 (Former site of Industrial Waste Treatment (IWT) Plant), including IR Site 25 (Bee Canyon Wash - partial)
8. Anomaly Area 3
9. Hangar 295
10. Command Museum, Bldgs 242 (including aircraft parts yard), 243 and 244
11. IR Site 2 (Magazine Road Landfill)
12. IR Site 1 (Explosive Ordnance Disposal Range)
13. IR Site 17 (Communications Station Landfill) including APHO-44
14. DRMO Bldgs 319 and 360

Radiological Sampling Status

Radiological Surveys (more than 6.4 million high-density survey points) resulted in collection of 192 solid samples

- IR Site 3 (Original Landfill) – 22 samples
- IR Site 5 (Perimeter Road Landfill) including APHO-46 – 5 samples
- IR Site 8 (DRMO Yard 1) - 21 samples
- IR Site 12 (IWT Plant) including Bee Canyon Wash (partial) – 16 samples
- Anomaly Area 3 – 1 sample
- Aircraft Parts Yard – 2 samples
- NBC Complex – including APHO-38 – 11 samples
- IR Site 1 (EOD Range) – 26 samples
- IR Site 2 (Magazine Road Landfill) – 31 samples
- IR Site 17 (Communications Station Landfill) including APHO-44 – 57 samples

Radiological Anomaly Status

Radiological Surveys (more than 6.4 million high-density survey points) resulted in the removal of 38 anomalies

- IR Site 3 (Original Landfill) – 1 anomaly
- IR Site 5 (Perimeter Road Landfill) – 1 anomaly
- IR Site 8 (DRMO Yard 1) – 9 anomalies
- IR Site 12 (IWT Plant) – 1 anomaly
- Aircraft Parts Yard – 1 anomaly
- IR Site 1 (EOD Range) – 16 anomalies
- IR Site 17 (Communications Station Landfill) – 9 anomalies

Radiation Survey Results

EOD Range (IR Site 1)

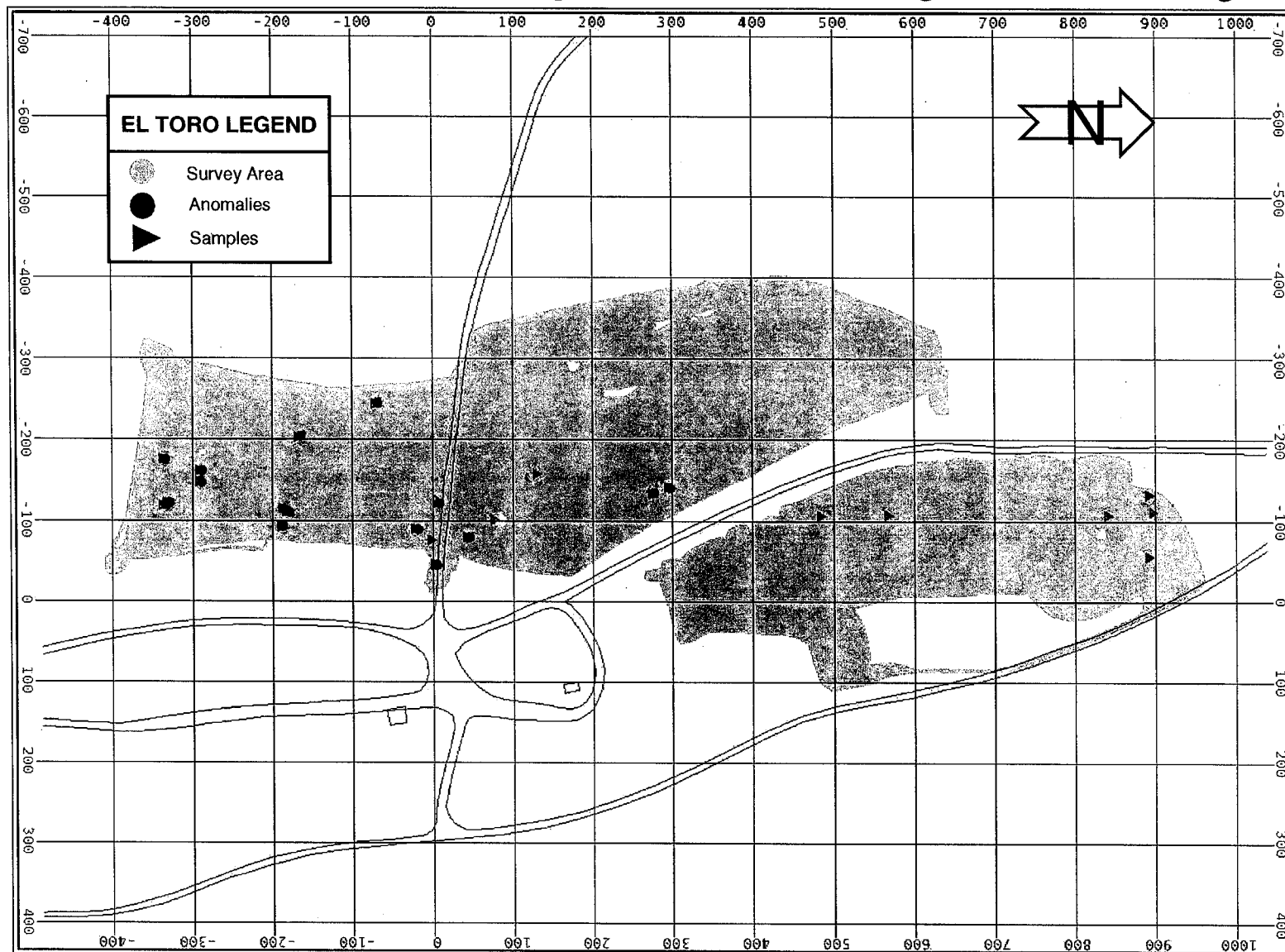
Approximate area planned for survey - 10 acres

Approximate area surveyed - 11 acres

16 anomalies were found during the collection of more than 580,000 high-density survey data points.

26 samples were collected at investigation level locations and analyzed for isotope(s) present.

IR Site 1 – High-Density Surveys



Radiation Survey Results

Magazine Road Landfill (IR Site 2) –

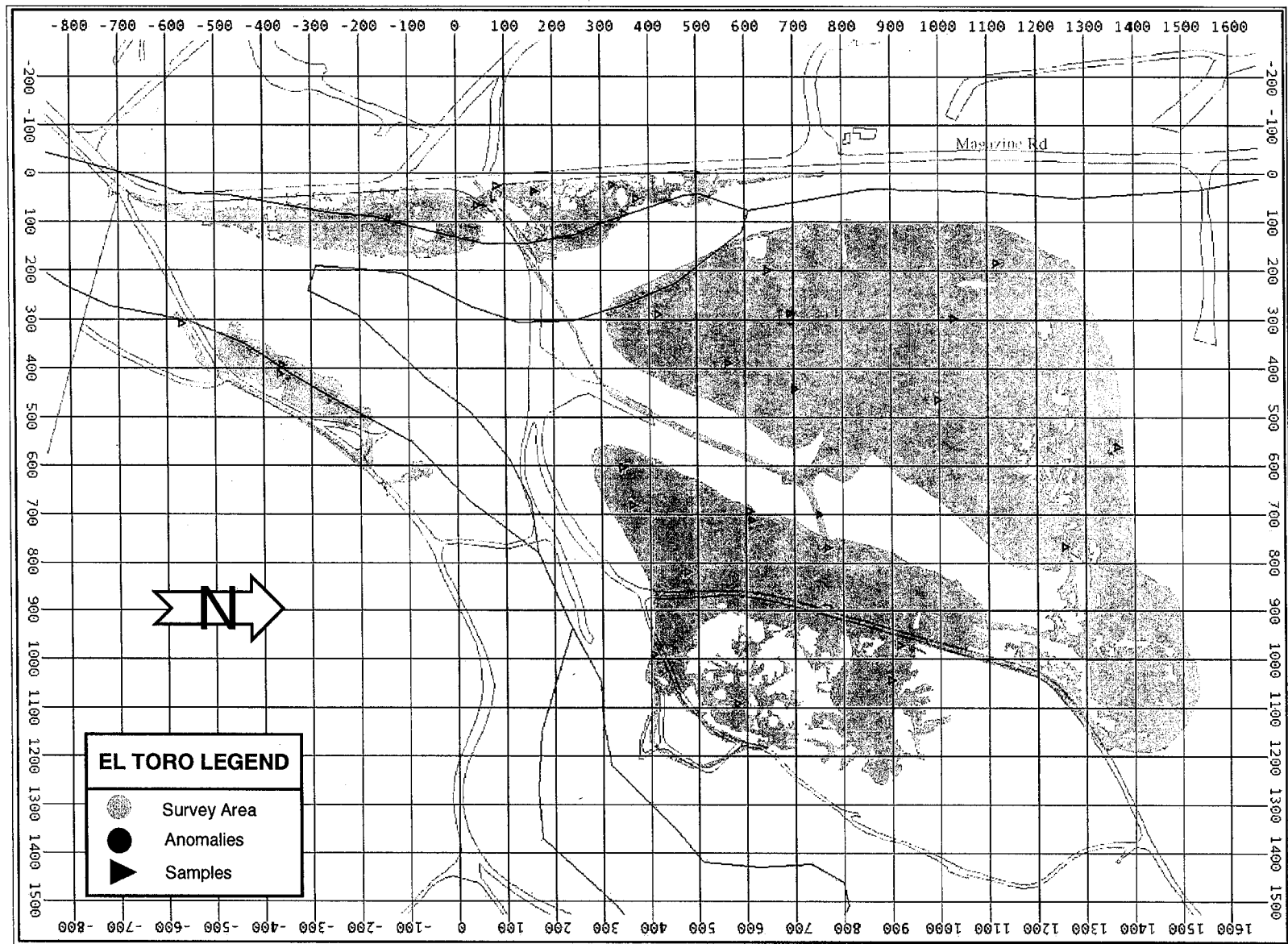
Approximate area planned for survey – 20 acres

Approximate area surveyed – 25 acres

No anomalies were found during the collection of more than 1,300,000 high-density survey data points.

31 sample were collected at investigation level locations and analyzed for isotope(s) present.

IR Site 2 – High-Density Surveys



Radiation Survey Results

Communications Landfill (IR Site 17)

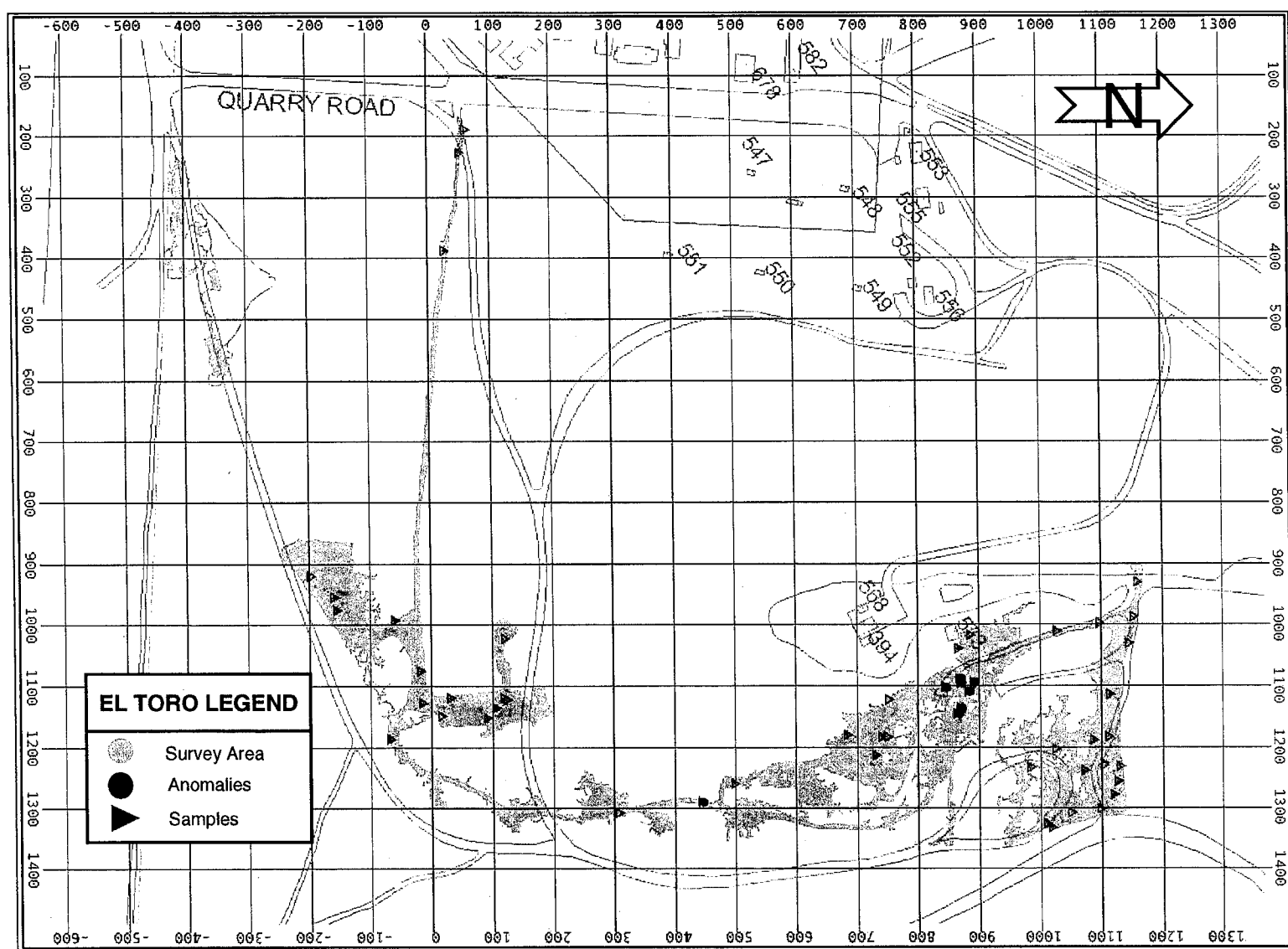
Approximate area planned to be surveyed – 4 acres

Approximate area surveyed – 7 acres

9 anomalies were found during the collection of more than 365,000 high-density survey data points.

55 samples were collected at investigation level locations and analyzed for isotope(s) present.

IR Site 17 – High-Density Surveys



Radiation Survey Results

APHO – 44 (adjacent to IR Site 17)

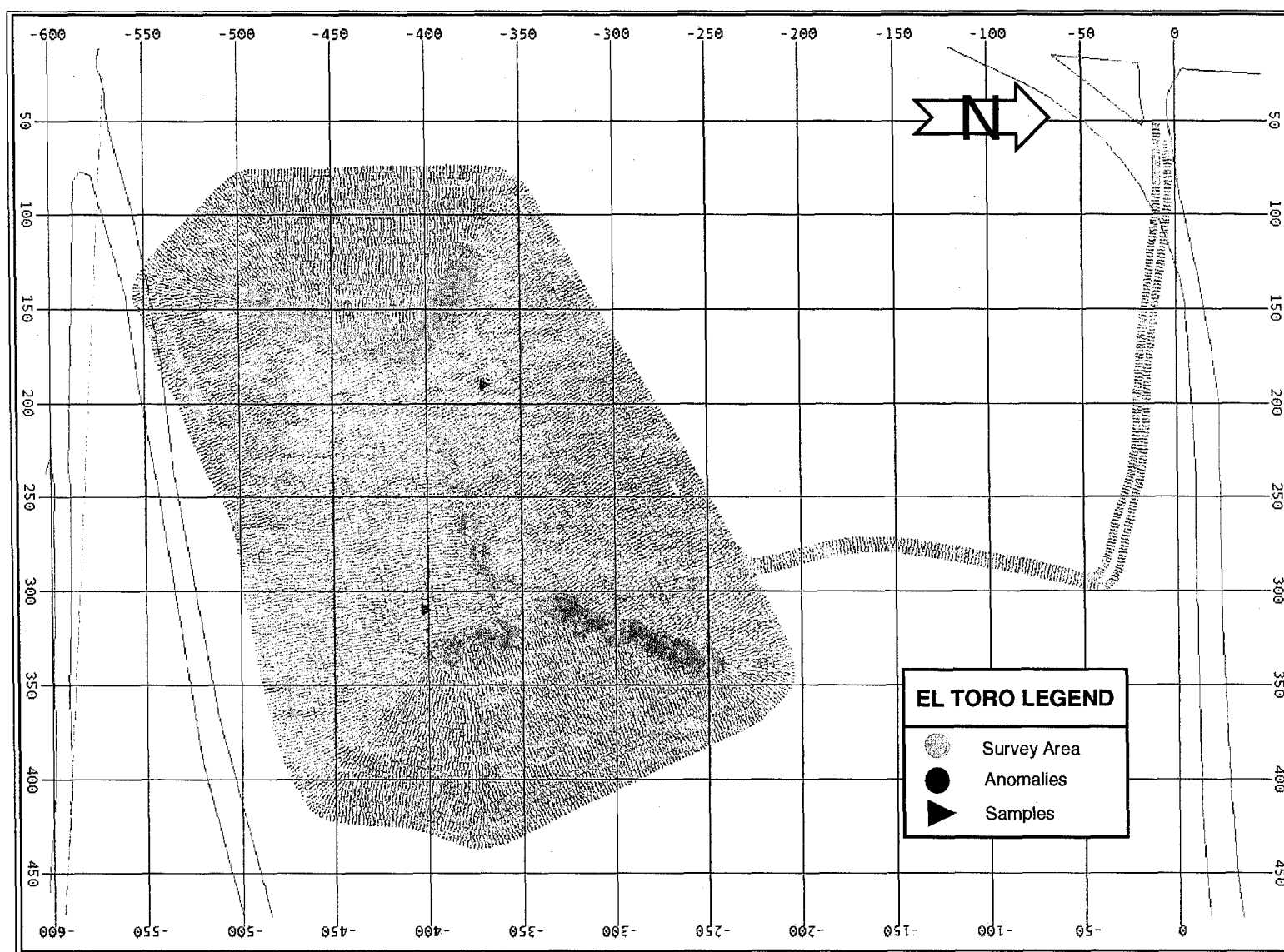
Approximate area of site – 2 acres

Approximate area surveyed – 2 acres

No anomalies were found during the collection of more than 134,000 high-density survey data points.

Two samples were collected at investigation level locations and analyzed for isotope(s) present.

APHO 44 – High-Density Surveys



Radiation Survey Results

Building Surveys and Swipe Samples – A total of nine buildings, containing more than 200,000 square feet were surveyed manually. Several buildings contained areas with survey readings above the investigation level; these areas were investigated on a sample basis and swipe surveys were taken as follows:

- Hangar 295 – 18 swipes
- Command Museum Complex (242, 243 and 244) – 16 swipes
- NBC Complex (787, 1789 and 1803) – 9 swipes
- DRMO Buildings 319 and 360 – 21 swipes

Radiation Surveys

Next Steps at MCAS El Toro:

1. Based on pending results of solid and swipe sample analyses, determine whether areas require remediation.
2. If remediation is required, prepare Radiological Work Plan to conduct the necessary radiological remediation and perform remediation.
3. Issue Radiological Release Report.

**MCAS EL TORO
RAB MEETING**

Preliminary Assessment

Building 307

November 28, 2001

Presented By
Crispin Wanyoike
Earth Tech Inc.

Preliminary Assessment

Building 307

• BACKGROUND

- Located near the northern boundary of IRP Site 24 - Vadose Zone VOC Source Area
- Building was historically used as a dry cleaning facility from approximately 1944 - 1977
- Limited soil gas sampling conducted as part of Phase I and Phase II Remedial Investigation at Site 24 did not detect any VOC in the soil

Preliminary Assessment Building 307

- **OBJECTIVES**

- Confirm previous investigation sampling that did not show a significant release (solvents) to the environment
- Conduct soil gas sampling within the building and any sewer lines connected to dry cleaning equipment
- Collect groundwater samples if elevated soil gas concentrations are detected at depth

Preliminary Assessment Building 307

- **Sampling Activities**

- Collected 84 shallow soil gas samples
- Collected 14 deep soil gas samples from locations that had elevated concentrations
- Soil gas samples were analyzed using a mobile laboratory for VOCs with 10 percent analyzed at a fixed based laboratory
- Collected 4 hydropunch groundwater samples at 3 locations and analyzed samples at a fixed-base laboratory for VOCs
- Collected 7 soil samples and analyzed samples at a fixed-base laboratory for VOCs

EXPLANATION

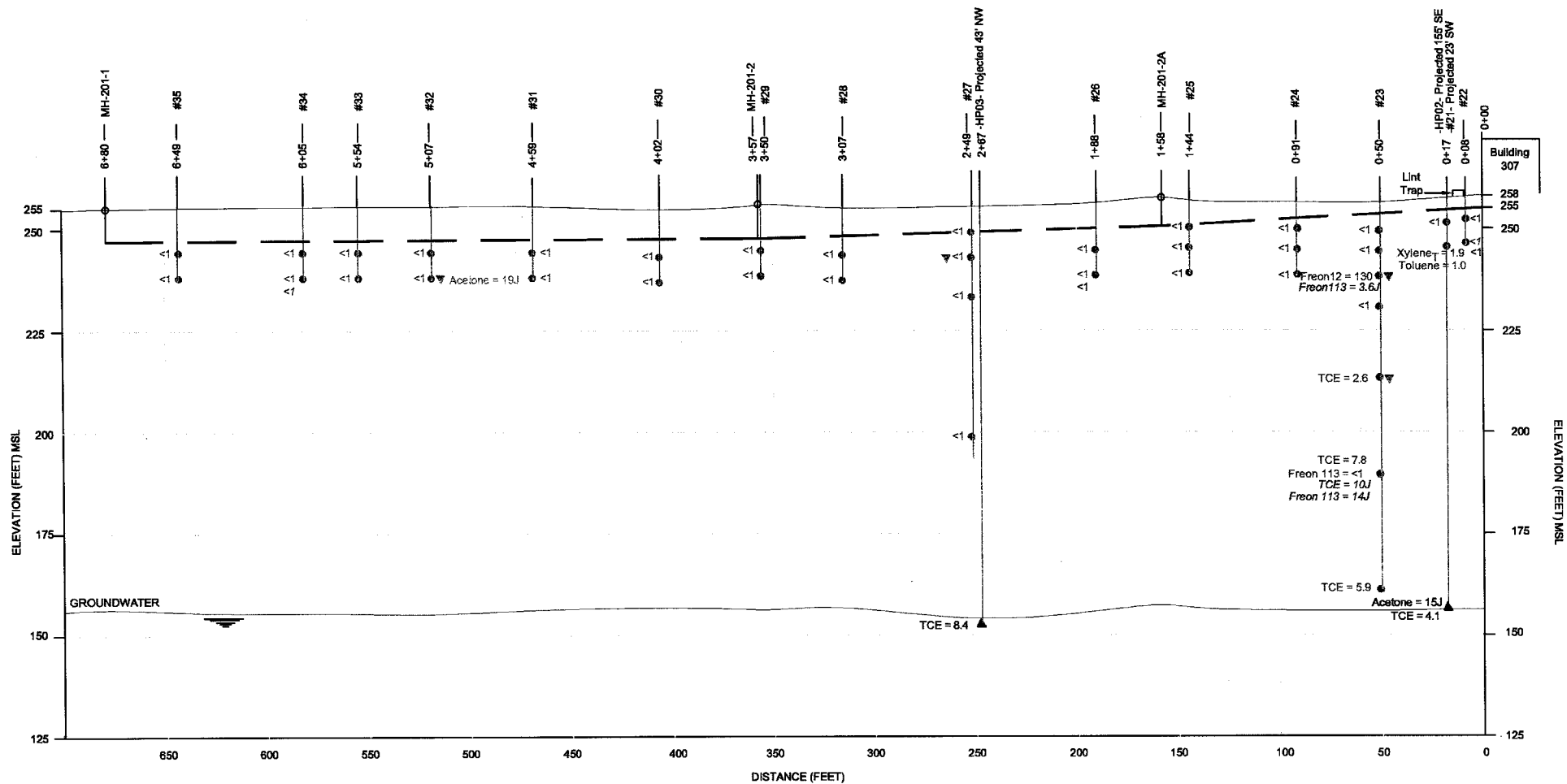
- 307 BUILDING
- MH-201-1 MANHOLE
- MH-201-A MANHOLE 201-A
- WV WATER VALVE
- G EXISTING GROUNDWATER WELL
- S EXISTING SOIL GAS WELL
- 1 FORMER UNLOADING WASHER
- 2 WASHER
- 3 DUMPING EXTRACTOR
- 4 CLEAN-OUT
- 5 SAWCUTS ON BUILDING FLOOR
(INDICATING POSSIBLE LOCATIONS
OF TRENCH DRAINS AND LAUNDRY
EQUIPMENT)
- E ELECTRICAL PANEL
- CI CAST-IRON PIPE
- VC VITRIFIED CLAY PIPE
- CPT CONE PENETROMETER TEST
- UGMW UPGRADED MONITORING WELL
- ESTIMATED GROUNDWATER FLOW
DIRECTION
- SANITARY SEWER LINE
- SECTION OF SANITARY SEWER LINE ASSESSED
- WATER LINES
- ELECTRICAL UTILITIES
- NATURAL GAS LINES
- SOIL GAS (SG) SAMPLE LOCATION
(CONCENTRATIONS IN µg/L)
- ▼ SOIL (S) SAMPLE LOCATION
(CONCENTRATIONS IN µg/g)
- ▲ HYDROPHONIC (HP) SAMPLE LOCATION
(CONCENTRATIONS IN µg/L)
- TCE = 3.6 DUPLICATE ANALYSIS SHOWN IN ITALIC TEXT
- <1 COMPOUNDS NOT DETECTED ABOVE THE
STATED REPORTING LIMIT
- µg/L MICROGRAMS PER LITER
- µg/g MICROGRAMS PER KILOGRAM
- TCE TRICHLOROETHENE
- T TOTAL
- J ESTIMATED CONCENTRATION
- U ANALYTE NOT DETECTED AT THE SPECIFIED
THRESHOLD
- R QUALITY CONTROL INDICATES THE DATA IS NOT
USABLE
- FREON 11 TRICHLOROFLUOROMETHANE
- FREON 12 DICHLORODIFLUOROMETHANE
- FREON 113 1,1,2-TRICHLORO-2,2,2-TRIFLUOROETHANE

NOT TO SCALE

Sample Locations/Results Map

Preliminary Assessment, Building 307

Date: 11-01	MCAS El Toro	Figure
Project No. 29307	EARTH TECH	1
A TUCSON INTERNATIONAL LTD. COMPANY		



NOT TO SCALE

EXPLANATION

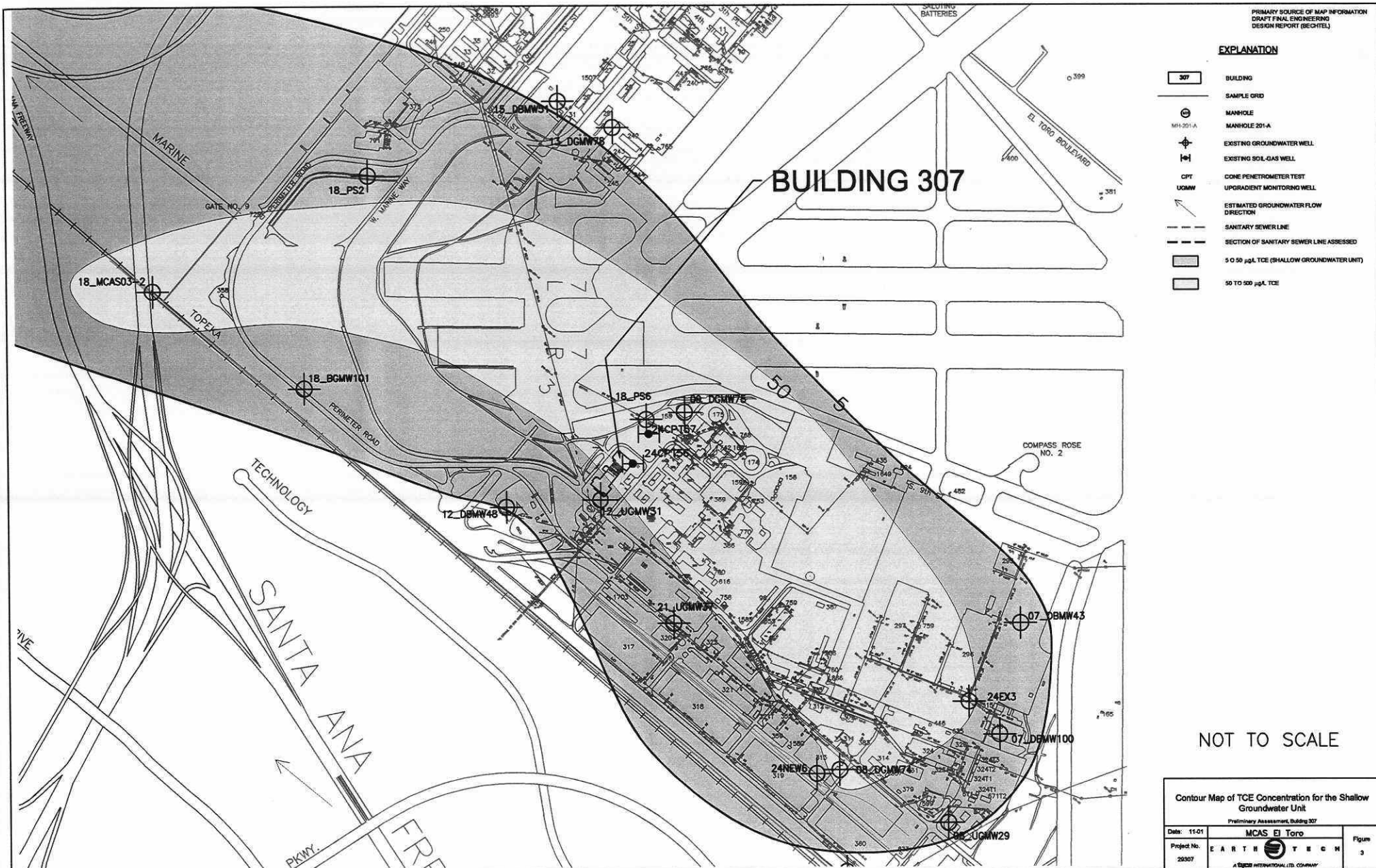
- — — Sanitary sewer line
- TCE = 3.6 Soil gas (SG) sample location (Concentrations in $\mu\text{g/L}$)
- ▼ TCE = 3.6 Soil (S) sample location (Concentrations in $\mu\text{g/kg}$)
- ▲ TCE = 3.6 Hydropunch (HP) sample location (Concentrations in $\mu\text{g/L}$)
- Manhole
- MH Man Hole

- TCE = 3.6 Duplicate analysis shown in *italic text*
- TCE Trichloroethene
- Freon 11 Trichlorofluoromethane
- Freon 12 Dichlorodifluoromethane
- Freon 113 1,1,2-Trichloro-1,1,2-trifluoroethane
- HP Hydropunch
- #20 Sample Location
- 0+00 Distance from Building 307
- MSL Mean Sea Level
- T Total
- J Estimated concentration
- U Analyte not detected at the specified threshold
- <1 Compounds not detected above the stated reporting limit

Sampling Results Along Sewer Line

Preliminary Assessment, Building 307

Date	11-01	MCAS El Toro	Figure
Project No.	29307	EARTH TECH	2
A tyco INTERNATIONAL LTD. COMPANY			



Preliminary Assessment Building 307

- **Sampling Results**

- Shallow Soil Gas
 - 4 of 76 shallow samples submitted to the mobile laboratory had concentrations above 1 µg/L.
 - Compounds detected included Freon 12, Freon 113, toluene and xylenes
 - 8 shallow samples submitted to the fixed-base laboratory had concentrations below 1 µg/L.
- Deep Soil Gas
 - 5 of 12 deep samples submitted to the mobile laboratory had concentrations above 1 µg/L.
 - Compounds detected included TCE and DCE
 - 2 deep samples submitted to the fixed-base laboratory had the following TCE at 10 µg/L and Freon 113 at 14 µg/L

Preliminary Assessment Building 307

- **Sampling Results**

- Soil Samples
 - None of the 7 samples collected had VOC concentrations above the reporting limit
- Groundwater/Hydropunch Samples
 - TCE detected in all three samples collected
 - Concentrations Ranged from 4.1 µg/L to 8.4 µg/L

Preliminary Assessment Building 307

- **Conclusions Recommendations**

- Previous conclusions that there has not been a release of VOCs in the vicinity of Building 307 have been confirmed.
- Sampling results along the sewer line segment indicate that there was no significant release of VOCs
- VOCs constituents and concentrations in groundwater are consistent regional groundwater VOC plume

- **Recommendation**

- No further investigation

Preliminary Assessment Building 307

- **Schedule**

- Draft Work Plan - issued May 2001
- BCT Review - June 2001
- Final Work Plan - July 2001
- Field Work - September 2001
- Draft Technical Memorandum - October 2001
- Final Technical Memorandum - December 2001



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 14, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: Draft Final Phase II Focussed Feasibility Study and Draft Proposed Plan, OU-3, IRP Site 16, Crash Crew Training Pit No. 2, Marine Corps Air Station, El Toro

Dear Mr. Gould:

Enclosed please find EPA's comments on the Draft Final Focussed Feasibility Study for Site 16. Comments from EPA's regional counsel, Thelma Estrada, apply to both the Proposed Plan and the Focussed FS.

As our comments indicate, EPA has the following three primary concerns:


- the FFS does not appear to provide an adequate range of alternatives (in particular, a true treatment option);
- the proposal to close the vadose zone requires further justification, and;
- the proposed monitoring remedy for the groundwater does not meet remedial action objectives.

In addition, we have some concern regarding the fact that this document is in draft final form. It appears that this report is significantly different from the draft document and, based on the comments EPA and the State have provided, there are critical issues that must be resolved before this report can be finalized. We suggest that the Navy consider holding working meetings with the BCT when developing the final report.

We look forward to discussing these issues in furtherance of the environmental cleanup of MCAS El Toro.

If you have any questions, please call me at (415) 744-2366.

Sincerely,

A handwritten signature in black ink, appearing to read "Nicole G. Moutoux". The signature is fluid and cursive, with the first name "Nicole" being more prominent and the last name "Moutoux" written in a continuous script.

Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

Enclosures

cc: Marc Smits, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Marcia Rudolph, RAB Subcommittee Chair
Ms. Polan Modanlou, MCAS EL Toro Local Redevelopment Authority

Draft Final Focused Feasibility Study for Site 16

General Comments

1. The three remedies described in the Draft Final FS are No Further Action, Groundwater Monitoring, and Containment with Groundwater Monitoring. The Focused FS should provide at least one remedial alternative that includes active treatment against which the other alternatives can be compared.
2. Given that the Multi-Phase Extraction Study was not effective for groundwater cleanup, but quite effective for soil, has the BCT ever discussed the viability of Air Sparging in conjunction with SVE?
3. In the discussions of Alternative 2, the Navy makes many references to natural attenuation, yet, the remedy proposed and evaluated is Groundwater Monitoring. Since the Navy believes that some form of natural attenuation is occurring, the Navy should consider adding natural attenuation as part of an additional more active alternative.
4. Comments on the Technical Memorandum for Site 16 should be resolved before this FS can be finalized.
5. It is not clear how the groundwater flow direction to the northeast at the site has been determined with certainty. The groundwater monitoring wells shown on Figure 1-13 are essentially co-linear. As long term monitoring of the site and the Navy's estimation of the extent of contamination at the site are dependent on the direction of groundwater flow at the site, it is critical that the direction of groundwater flow at the site be determined with accuracy. If additional groundwater elevation data from adjacent sites is available to support the Navy's assumed groundwater flow direction, please present it in the Draft Final Phase II Focused Feasibility Study Report. If this data is not available, please indicate how sufficient data will be obtained to determine the direction of groundwater flow at the site or provide further justification for why the stated groundwater flow direction is accurate.
6. The FFS Report indicates that there may be up to 90,000 gallons of petroleum hydrocarbons in the site vadose zone (Table 2-4). It is not clear what influence the presence of these hydrocarbons has on the concentrations of trichloroethylene (TCE) detected in soil gas collected from the site vadose zone, or on the mass of TCE present in the vadose zone soils. Because chlorinated solvents were co-disposed with the hydrocarbons used at this fire-fighting training facility, significant amounts of TCE may still be contained in this hydrocarbon matrix. Mass transfer limitations from this matrix may not release TCE to the soil gas in the time frame considered by the Navy, and thus the rebound period allowed by the Navy to assess the effectiveness of the vadose zone component of the multiphase extraction (MPE) may not have been sufficient. Please revise the FFS Report to address the possible interaction between the chlorinated solvents and the petroleum hydrocarbons that are still present in the site vadose zone.

7. The modeling of the future movement of the TCE plume and of the vadose zone as a continuing source to the groundwater employs a number of assumptions and simplified conditions, and therefore the quality of the modeling results may not be suitable to the remediation decisions to be made at the site, particularly if the decision is to only monitor the TCE plume over 19 years when the model estimates the concentrations will have decreased below the 5 ug/L target Maximum Concentration Level (MCL). For example, the assumption that TCE does not sorb to saturated zone soils is conservative in overestimating the extent of the plume, but this assumption also may underestimate the estimated time required for concentrations to drop below the MCL. Please conduct additional modeling based on more accurate site information, and possibly includes some sensitivity analyses to provide a better evaluation of future groundwater conditions.
8. The FFS lacks a description of any regrading at the site. Ponding of rainfall or other water releases at the site would increase infiltration into the site vadose zone which could lead to the transport of contaminants (VOC and petroleum hydrocarbons) to groundwater. The Navy should consider adding regrading of the site to all alternatives other than NFA.

Specific Comments

1. **Section 1.3.2 Physical Characteristics of the Site, Page 1-25, Figures 1-12 and 1-13:** The text states that the regional groundwater flow is to the northwest in the shallow and deep aquifers, and the figures show these same directions for the Site 16 Units 1 and 2. However, the figures show the monitoring wells in a near-linear alignment which then does not conclusively define flow in the northwest direction. Given the complex lithology and possibly discontinuous sand lenses, please discuss how these few wells in a narrow linear array are sufficient to determine that preferential groundwater flow is not in a more northerly or westerly direction, and whether these monitoring wells shown are suitable for defining and monitoring the TCE plume.
2. **Section 1.3.3.1 Draft Final Remedial Investigation Report, Page 1-26:** Cross sections showing the presence and contours of petroleum hydrocarbons would be useful to better develop a conceptual model for chemicals that remain in soil. Contours for TCE in the soil profile on Figures 1-9 and 1-10 would also be useful for comparison with the petroleum contours because the mass of petroleum is likely a sink of TCE to the vadose zone as well as saturated zone soils. Please provide these contours and discuss the uncertainties in the mass estimates of both TCE and the petroleum hydrocarbons, noting the complex lithology of the site as shown in Figures 1-9 and 1-10, and include in particular the extensive coarse-grained sands near the water table.
3. **Figure 1-8, Page 1-31:** This figure only shows the 5 ug/L TCE contour but groundwater concentrations at the site have been recently measured as high as 260 to 390 ug/L. Please include the contours for these higher concentrations contours to better describe the presence of TCE in groundwater at Site 16.

4. **Section 1.3.4 Multiphase Extraction Pilot Study, Pages 1-39 through 1-83:** While a large mass of VOCs have been removed by the Multiphase Extraction (MPE) Pilot Study, the estimates of the masses of TCE and petroleum hydrocarbons remaining in soil appear to have considerable uncertainty. For example, page 1-71 notes that approximately 72 pounds of TCE was removed during the MPE study and that previous calculations had estimated approximately 60 pounds of TCE were present; page 1-74 states that a revised calculation now estimates that 99 pounds of TCE were initially present. Please discuss the uncertainties in these estimates, including an evaluation of the complex lithology that may have allowed preferential extraction through more permeable soils and leaving a significant mass of TCE in the petroleum phase that is available for mass transfer-limited diffusion, concentration buildup, and TCE loading to groundwater.
5. **Section 1.3.5.4 Chemical Persistence and Mobility and Table 1-18, Pages 1-96 through 1-101:** The data in Table 1-18 are not appropriate for evaluating the mobility and persistence of VOC constituents in Site 16 soils in the most contaminated area. The amount of each constituent sorbed is presented as a range of percent values based on organic carbon data measured on Unit 3 soils, and the organic carbon on soils in the contaminated area (Unit 2) may be higher than these background soils and therefore more TCE may be in the sorbed phase. The calculations also ignore sorption to the clay fraction of soils which is important when the organic carbon content of soils is very low. The listed transformation half-lives by microbial processes for constituents in soils are also inappropriate as they are literature values. More accurate representations of sorption should use organic carbon data measured on the specific soil parcels of interest; if these data are measured for Site 2, please instruct the laboratory to use methods that do not lose the more volatile hydrocarbon petroleum constituents that are often lost using the standard organic carbon method. Please also revise the text to state that the listed half-lives in soil are likely underestimates of persistence, and they do not pertain to constituents that are within the hydrocarbon matrix; for example the listed "conservative" biotransformation half-lives (see footnote e) in Table 1-18 for TCE and benzo(a)pyrene are 1 year and 1.45 years, respectively, and the persistence of these chemicals at many other sites shows these half-lives are clearly underestimates.
6. **Section 1.3.5.5 Groundwater Modeling and Mass Loading Evaluation, Page 1-102:** The modeling and calculation effort presented in this section are described as "limited" and "simplified", respectively, and yet the results are represented as being key for making decisions that groundwater monitoring and possibly groundwater extraction are sufficient for groundwater remediation, and that further soil venting is not necessary. Although some aspects of the modeling assumptions are not clear in this Draft Final Study Report, an evaluation of the information available does suggest that some assumptions may be inappropriate, and some of these issues are discussed below. Please consider collecting additional data to support the assumed site specific conditions or conducting some analyses of the sensitivity of the calculation/modeling results.
7. **Groundwater Model Results, Page 1-104 and Table 1-20:** The text and Table 1-20 states that the retardation factor is assumed to be zero (sorption does not occur) and which is considered conservative in projecting the maximum extent of the TCE plume.

While an estimation of the maximum extent of the TCE plume is useful in the absence of site specific data, neglecting sorption ignores the saturated zone soils as a continuing source of TCE to the groundwater plume. This assumption of no sorption then minimizes the time required for the plume concentrations to drop below the 19 years as projected by the model. It is also unclear how the model results reflect amount of TCE already sorbed to these soils if the amount of TCE sorbed is higher than calculated in table 1-18. Please reevaluate the consequences of the assumption of zero TCE sorption on soils with regard to the extent of the plume, the concentrations within the plume and the time for concentrations of TCE to drop below the stated 5 ug/L TCE target value. In the absence of site specific data, please consider several modeling scenarios where a range of TCE sorption to soil is used to estimate the TCE concentrations in groundwater, and where the sorbed TCE mass is also considered as a continuing source to groundwater.

8. **Groundwater Model Results, Page 1-104 and Table 1-20:** The first paragraph states that the modeling simulation was conducted to "represent natural groundwater conditions at Site 16 (i.e., no groundwater pumping)", and yet Table 1-20 indicates that sustained pumping at 15 gallons per minute (gpm) was assumed at 16GE1 and 0.5 gpm at 16MPE1. Later discussions indicate that these rates were assumed for the groundwater extraction scenario. Please clarify if pumping at 16GE1 and 16MPE1 was assumed for the natural groundwater conditions, contrary to what is stated in the text. Please also clarify why pumping of 0.5 gpm at 16MPE1 was included in the scenarios and whether any other parameters were changed between the scenarios.
9. **Mass Loading Threshold Estimates, Page 1-111:** The "simplified calculation" used to estimate the mass loading to groundwater from vadose zone soil gases is useful initial information for a conceptual model but several aspects of the calculation are not clear. For example, if the groundwater model used the same parameters listed in Table 1-20, please indicate if the assumed mixing zone is actually 30-feet deep, recognizing the considerable dilution is provided by this assumption. Please discuss the condition that, if no sorption is assumed and the existing TCE in groundwater is effectively decreased by advection/dilution and dispersion, TCE loading from an 83 ug/L concentration in soil moisture into a shallower mixing zone would exceed the 5 ug/L MCL value. Please also provide more information on how the loading of TCE in soil moisture was simulated for the modeling effort.
10. **Section 1.3.5.5 Groundwater Modeling and Mass Loading Evaluation, overview for entire section:** Although the modeling and calculations are limited and have many assumptions, the modeling results do not appear to be consistent with historical site data and the site conceptual model that is described on pages 1-98 and 1-99. For example, the vadose zone-to-groundwater loading calculation develops a "modeling factor" of 16.6 that relates TCE concentration in soil moisture to that in groundwater (83 ug/L and 5 ug/L, respectively (page 1-115). The TCE concentrations in groundwater are approximately 250 ug/L for the April 2001 sampling (Table 1-14), suggesting the corresponding soil moisture concentrations of TCE producing such groundwater concentrations would then be on the order of a 4,000 ug/L. If "most of the TCE loading to groundwater ... occurred

15 to 28 years ago" (page 1-104), and TCE concentrations in groundwater have been decreasing in the subsequent 15 to 28 years as the modeling effort suggests, then the TCE concentrations attributed to leaching would have been substantially higher than the 4,000 ug/L value. Such TCE loading to groundwater would suggest high TCE concentrations that also could be attributed to TCE movement to the water table either in a separate TCE phase or at a high concentration in the petroleum carrier. Please evaluate the uncertainties with regard to the distribution of chemicals at the site as they are present in the vadose zone and as a source to groundwater. Please revise the FFS Report to provide additional details on the assumptions of the groundwater model and how the allowable soil gas concentration was calculated. Please also justify why the mass loading does not apparently consider the hydrocarbon matrix in the vadose zone as a TCE source.

11. **Section 2.3.2 Saturated Zone Contamination, Page 2-16 and Tables 2-7 and 2-8:** There is no discussion of the uncertainties of the plume volume and mass of TCE in groundwater in the cited tables. Please evaluate the uncertainties in these data, and explain how the average TCE concentration of 60 ug/L was selected. Please also explain why the calculation of the estimated mass of TCE in groundwater does not include any contribution from the TCE sorbed to saturated zone soils.
12. **Section 3.2.2.1 Long Term Groundwater Monitoring, Page 3-11:** In addition to the parameters listed in the groundwater monitoring program, please also include Total Organic Carbon (TOC) analyses, particularly if Total Petroleum Hydrocarbons by EPA Method 8015-M may be dropped from the monitoring program. Please consider that TOC is a very useful measure of groundwater quality with regard to changes in site geochemistry as well understanding the quality of groundwater itself.
13. **Costs, Tables 4-1 and 4.2, Pages 4-14 and 4-22, respectively:** The indirect costs require some explanation as to apparent discrepancy in the values reported and which are magnified into the Total Cost estimates by the contingency and escalation factors. In particular, the Total O&M cost for Alternative 2 is \$568,233 and the Indirect Cost is \$271,445, or a factor of 2. For Alternative 3 the corresponding costs are \$1,166,239 and \$1,381,376, or a factor of 0.8. While it is understood that these costs result from the use of the RACER cost model, please explain the substantial increase in the indirect costs for Alternative 3.

Comments from EPA's Office of Regional Counsel:

1. Both the Proposed Plan and the draft final FFS state that alternatives 2 (groundwater monitoring and deed restrictions) and 3 (containment and deed restrictions) will comply with ARARs. However, both documents do not even cite to, much less discuss, a potential State ARAR, Resolution 92-49. Res. 92-49 requires dischargers to cleanup and abate the effects of their discharges in a manner that promotes attainment of background water quality, or the best water quality (not exceeding water quality objectives) that is reasonable if background water quality cannot be restored. Res. 92-49 also requires the discharger to conduct a technical and economic feasibility analysis in deciding what best

water quality is reasonable. If the DON does not agree that Res. 92-49 is a State ARAR, it nevertheless still needs to discuss and explain its analysis in these documents. The two documents also need to state what the Regional Water Board's position is on DON's position regarding Res. 92-49 at El Toro.

2. Alternative 2, which the DON prefers, is confusing. This alternative is called groundwater monitoring with deed restrictions. Yet, in discussing this alternative in both the FS and the PP, DON seems to be also stating that under this alternative, groundwater will also be cleaned up through "natural processes" to MCLs. If DON is proposing an alternative that is basically monitored natural attenuation, it should call it that and discuss the criteria and requirements for MNA.
3. It appears that the Navy is essentially stating that since the aquifer at this site is not currently a source of drinking water because of high TDS, that it is fine to allow the groundwater to stay contaminated for 19 years (the time for the plume to go down to MCLs under alternative 2). I believe this aquifer is a potential source of drinking water. DON needs to justify its decision not to cleanup this potential source of drinking water for the next 19 years, and why such a decision still complies with Federal and State ARARs.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

September 27, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: Draft Technical Memorandum, Reevaluation of Risk, IRP Sites 8, 11, 12, Marine Corps
Air Station, El Toro, dated August, 2001

Dear Mr. Gould:

EPA has reviewed the above-referenced technical memorandum. In general, we understand the Navy's basis for conducting this reevaluation, however the results provided in this memorandum does not appear to significantly change the risks that were presented in the Proposed Plans and RODs. Our enclosed comments address our specific concerns.

If you have any questions, please call me at (415) 744-2366.

Sincerely,

A handwritten signature in cursive script, reading "Nicole G. Moutoux", is positioned above the printed name.

Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

Enclosures

cc: Michelle Sondrup, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Marcia Rudolph, RAB Subcommittee Chair
Ms. Polan Modanlou, MCAS El Toro Local Redevelopment Authority

EPA Comments on Reevaluation of Risk for IRP Sites 8, 11, and 12

General Comment

While we understand the Navy revisiting their initial decisions due to changed in toxicity values, given that the majority of risks are due to PCBs, and risks did not significantly change at most sites, we find it difficult to support NFA using the justification in the tech memo, particularly when these risks and proposed actions have already been presented to the public.

Specific Comments

Site 8- Units 2 and 3

The Navy did not collect any additional data for these units and the risk did not change significantly using the new toxicity factors. Given that the HI remains above 1 and is primarily due to PCBs, which are persistent, and clearly a Navy source of contamination, EPA is not convinced that the rationale provided by the Navy for NFA is adequate.

Site 8 - Unit 5

The drawing provided in Appendix D is not very legible. The reader is unable to distinguish between PAHs and pesticides (as both are green on the legend). In addition, it is difficult to determine where the Phase II samples were taken. As the Phase II sample results are the basis for changing the decision to NFA, please provide a more legible map.

Site 11-Unit 1

As mentioned for Site 8, the Navy did not collect additional samples for this location, the risk did not significantly change, and the HI is still at 2.49 for the persistent contaminant PCBs. EPA does not believe that NFA is justified based solely on a change in toxicity values.

Site 11-Unit 2

Although the risk is quite low for this unit, the recalculated risk is not significantly lower and all the additional samples detected PCBs at some level. Given that the additional sampling confirmed the existence of PCBs, EPA again does not feel that NFA is justified.

Site 12 - Unit 3

Please note that on page 4-2, the newly calculated residential risk should be 2.1×10^{-5} instead of 1.1×10^{-5} .

As above, the risks for this unit decreased only slightly from the original risk and the HI remains over 3. The additional samples appear to have only be analyzed for pesticides and herbicides and therefore are not very useful in determining how much risk is attributable to arsenic, which the Navy maintains is responsible for driving the risk.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

October 2, 2001

BRAC Environmental Coordinator
Base Realignment and Closure, Environmental Division
Attn: Mr. Dean Gould
P.O. Box 51718
Irvine, CA 92619-1718

RE: Draft Work Plan, Aquifer Test, IRP Site 2, Marine Corps Air Station, El Toro, dated August, 2001

Dear Mr. Gould:

EPA has reviewed the above-referenced work plan for an aquifer test at IRP Site 2, Magazine Road Landfill. Please find our comments enclosed.

If you have any questions, please call me at (415) 744-2366.

Sincerely,

A handwritten signature in black ink, appearing to read "Nicole G. Moutoux".

Nicole G. Moutoux
Project Manager
Federal Facilities Cleanup Branch

Enclosures

cc: Don Whittaker, SWDIV
Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Marcia Rudolph, RAB Subcommittee Chair
Ms. Polan Modanlou, MCAS EL Toro Local Redevelopment Authority

Comments on Draft Workplan for Aquifer Test, IRP Site 2, Magazine Road Landfill

General Comments

1. Please provide an explanation for the long duration of the proposed pump test(6 months). It appears that with such a long testing period in conjunction with locating the testing wells in the highest concentration areas of the plume, that much of the groundwater contamination may be addressed.
2. Given that perchlorate has been detected in several wells, it should be added to the analyte list.

Specific Comments

1. Pg 3-2, Table 3-2: The Navy should consider sampling all wells, not just those listed on Table 3-2, for Natural Attenuation parameters.
2. Pg 3-10, Section 3.2.4, Piezometer Construction: Please consider making the piezometers 2" diameter so that sampling ports can be installed.
3. Pg 3-11, Section 3.2.5, Aquifer Test: The Navy should consider collecting samples weekly for VOC analysis instead of monthly.
4. Pg 3-7 and 3-8, Section 3.1.3 and Table 3-4: In the last paragraph on page 3-7, the Navy states, "The proposed extraction and observation wells, pumping scenario, and approximate distances from pumping to observation wells are listed in." It appears that this should say listed in Table 3-4. In looking at Table 3-4, it is unclear why certain wells were chosen as observation points. Please provide such rationale.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

November 15, 2001

Mr. Dean Gould
Base Realignment and Closure
Environmental Coordinator
Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, CA 92132-5190

Re: FFA Schedule Extension Request for Sites 3 and 5, Marine Corps Air Station, El Toro,
dated November 14, 2001

Dear Mr. Gould:

EPA has received your request for an extension to the FFA schedule for submittal of the draft final ROD for Sites 3 and 5. We understand that the delay is primarily due to additional time needed to complete the radiological survey.

The Navy is proposing to issue the draft final ROD for Sites 3 and 5 and the El Toro Draft Release Report for the radiological survey concurrently in order to expedite the remedy for Sites 3 and 5. Although we are in support of expediting remedial action at El Toro, depending on the complexity of the DRR and the number of changes in the draft final ROD, EPA may need to request additional review time beyond the suggested 30 days.

With above understanding, EPA grants the Navy's request for an extension to submit the Draft Final ROD for Sites 3 and 5 from November 14, 2001 to February 15, 2002.

If you have any questions, please call me at (415) 972-3012.

Sincerely,

A handwritten signature in cursive script, reading "Nicole Moutoux".

Nicole Moutoux
Project Manager
Federal Facilities Cleanup Branch

cc: Triss Chesney, DTSC
Patricia Hannon, RWQCB
Greg Hurley, RAB Community Co-Chair
Polin Modanlou, MCAS El Toro Local Redevelopment Authority



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

October 3, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

DRAFT WORK PLAN, AQUIFER TEST, INSTALLATION RESTORATION PROGRAM
SITE 2, MAGAZINE ROAD LANDFILL, MARINE CORPS AIR STATION (MCAS) EL
TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed the referenced Work Plan dated August 2001 that was received by this office on September 4, 2001. The Work Plan details the objectives and procedures to characterize aquifer properties, extent of volatile organic compounds (VOCs) in groundwater, and natural attenuation properties of groundwater.

After review of the document, DTSC has the following general comments:

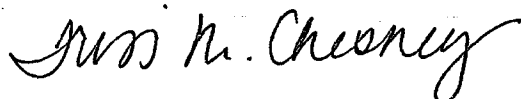
1. The nature and extent of contaminants in groundwater should be characterized and submitted for review prior to initiating aquifer testing. When evaluating the nature and extent of contamination, please provide information regarding the potential sources of contamination.
2. Please clearly identify and evaluate the existing hydrogeologic information obtained during the Remedial Investigation (Refer to Section 1.4.4) and explain how the results of new testing will supplement or modify the existing information. For the proposed aquifer testing, pumping from six wells over a total pumping duration of six months is proposed. Please provide additional justification for the substantial pumping that is proposed.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Web-site at www.dtsc.ca.gov.

Mr. Dean Gould
October 3, 2001
Page 2

In addition to the comments provided above, please address the enclosed comments prepared by the DTSC Geologic Services Unit. If you have any questions, please contact me at (714) 484-5395.

Sincerely,



Triss M. Chesney, P.E.
Remedial Project Manager
Southern California Branch
Office of Military Facilities

Enclosure

cc: Ms. Nicole Moutoux
Remedial Project Manager
U. S. Environmental Protection Agency Region IX
Superfund Division (SFD-8-1)
75 Hawthorne Street
San Francisco, California 94105-3901

Ms. Patricia Hannon
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339

Mr. Gregory F. Hurley
Restoration Advisory Board Co-chair
620 Newport Center Drive, Suite 450
Newport Beach, California 92660-8019

Ms. Polin Modanlou
Environmental Remediation Manager
MCAS El Toro Local Redevelopment Authority
Building 83
P.O. Box 53010
Irvine, California 92619-3010



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

MEMORANDUM

TO: Triss Chesney
Hazardous Substances Engineer
Office of Military Facilities

FROM: Frank Gonzales, C.Hg. *FG*
Hazardous Substances Engineering Geologist
Geological Services Unit

REVIEWED BY: Theodore R. Johnson, C.E.G., CHg. *TRJ*
Senior Hazardous Substances Engineering Geologist
Geological Services Unit

DATE: October 1, 2001

SUBJECT: DRAFT WORKPLAN AQUIFER TEST, IRP SITE 2, MAGAZINE
ROAD LANDFILL, MARINE CORPS AIR STATION, EL TORO,
CALIFORNIA

PCA: 20017059

SITE: 400055-47

REQUEST: 20017059

INTRODUCTION

As requested, the Cypress Geological Services Unit (GSU) staff of the Department of Toxic Substances Control (DTSC), Site Mitigation Program reviewed the *Draft Workplan, Aquifer Test, IRP Site 2, Magazine Road Landfill, Marine Corps Air Station, El Toro, California (the Plan)*, dated August 2001. The Plan was prepared by Earth Tech, Inc.

This memorandum contains general and specific comments and recommendations (in bold) on the Plan. All comments should be addressed before finalizing or implementing the Plan.

BACKGROUND

Site 2 was a landfill in the eastern portion of the El Toro Marine Corps Air Station. The landfill was used from the 1950s until about 1980. Suspected wastes disposed of in the landfill included: construction debris, municipal waste,

batteries, waste oil, hydraulic fluid, paint residue, transformers, and waste solvents.

Groundwater encountered at Site 2 occurs in the alluvium and bedrock. Hydrogeologic conditions are heterogeneous and range from unconfined to confined conditions.

Volatile organic compounds (VOCs) were confirmed in two plume areas downgradient from Site 2. In both, VOC concentration exceeded the Maximum Contaminant Levels (MCLs). Further investigation is proposed in the Plan to define the complete lateral and vertical extent of contamination.

Previous investigations generated preliminary data on aquifer properties. Hydraulic conductivity values were calculated from slug tests and aquifer tests. Additional data on aquifer properties and evaluating the feasibility of long-term groundwater extraction are proposed in the Plan.

GENERAL COMMENTS

1. The proposed groundwater characterization will aid in delineating groundwater contamination. However, subsequent fieldwork is best described as feasibility testing to aid in screening and selecting remedial alternatives for groundwater extraction. Therefore, due to the nature of the proposed work, subsequent aquifer testing and long-term pumping should not be undertaken until all parties agree that all known contaminants and the extent of groundwater contamination are determined.
2. It is unclear how the previous information collected on the aquifer hydraulic properties were incorporated. During the Remedial Investigation (RI), aquifer tests were performed at three of the six proposed extraction wells. This fact was mentioned in the Plan (Section 1.4.4), but detailed analysis of the significance of the aquifer characterization was not provided. Therefore, it is unclear if the proposed testing will serve to validate existing hydrogeologic information or modify the conceptual hydrogeologic model for the site.
3. Based on the previous aquifer test data, the feasibility of sustained pumping at several proposed wells may be limited. For example, the Plan (Table 3-4) describes the sequence for incorporating additional wells into the test. It appears that all these wells are screened in a confined bedrock unit that is laterally heterogeneous containing low permeability zones. This was documented in the RI, where pumping rates could not be increased during step drawdown testing at monitoring well 02DGMW60. The testing of low-permeability zones within this unit may overlook areas of the aquifer with higher permeability, which allow for increased groundwater flow and potentially greater migration of contaminants.

Since wells will be brought on-line during the test, it is imperative that the first wells tested in each plume be the most efficient, highest yielding wells for collecting the best data possible. Therefore, the sequence for aquifer testing at each plume is critical and should consider previous data collected during the RI for targeting wells screened in the most permeable zones. See Specific Comments 3 and 5 for details on establishing pumping rates and sequencing wells.

SPECIFIC COMMENTS

1. Page 1-11, Figure 1-4, Groundwater Elevation Contours. This figure appears to combine water levels for wells screened in both unconfined and confined aquifers. For example, during the RI at Site 2, two aquifer systems were described with varying groundwater flow directions and gradients (see Section 3.0 of the RI, 1997).

The contractor should indicate whether this figure represents hydrogeologic conditions in the alluvium or bedrock. In addition, the contractor should provide groundwater contour maps for both the unconfined and confined aquifers. Any conflicts with the final RI should be discussed and adequately justified.

2. Page 2-1, 2.2 Project Decision Questions. A key question not yet resolved is the total extent of VOCs in groundwater at Site 2. The extent of groundwater contamination must be completely defined before initiating an extended period of ground water extraction for the following reasons: long-term pumping would affect aquifer flow characteristics and pumping may alter the distribution of contaminants in groundwater.

The contractor should submit the results of the groundwater investigation prior to initiating long-term aquifer testing. This submittal should consist of the proposed hydropunch sampling, evaluation of natural attenuation, and any other groundwater data results.

3. Page 3-7, 3.1.3 Aquifer Test. The Plan indicates the pumping rate for each well will be one gallon per minute; however, no rationale was provided selecting this rate. The aquifer test should stress the aquifer for obtaining the most accurate data to represent the hydrogeologic properties of the aquifer. This will require performing the test at a pumping rate that balances the pumping and ability of the well to recharge.

The contractor should include a step drawdown test using at least three successive higher pumping rates. The step drawdown test should be

performed before starting the aquifer test to establish the optimum pumping rate.

4. Page 3-7, 3.1.3 Aquifer Test, last paragraph. The last sentence in this paragraph contains a typographical error, where it states "... pumping and observation wells are list in "
5. Page 3-7, 3.1.3 Aquifer Test. The Plan indicates the aquifer test will be phased-in over a six-month period. The first well within each plume will be pumped for one month before adding subsequent pumping wells over the next five months. Under this scenario, the first month of the aquifer test is the most critical because it will likely generate the highest quality data for estimating hydraulic conductivity, aquifer transmissivity, and storativity. The long-term sustainability of groundwater extraction can then be evaluated as other wells are added.

The contractor should reevaluate the pumping order of wells in the TCE plume. Pumping should begin using monitoring well 02NEW17 if this well is screened in a unit with higher permeability than well 02DGMW60.

6. Page 3-11, 3.2.5 Aquifer Test. All water level transducers used on the project should be calibrated prior to aquifer testing to ensure proper measurements of water levels. Instrument calibration is routinely performed and described as part of the project quality assurance/quality control (QA/QC).

The contractor should add the calibration of transducers to the project QA/QC plan.

7. Page 3-12, 3.2.6 Groundwater Sampling. The compound 1,4-dioxane is becoming more prevalent at sites throughout California, where chlorinated solvents are a problem in groundwater. This compound is used as a stabilizer in the manufacture of chlorinated solvents and is highly water soluble. Its high water solubility causes it to migrate more rapidly in groundwater than other compounds in a chlorinated solvent mixture.

The contractor should include the analysis of 1,4-dioxane in groundwater samples. Detection limits should be appropriate for meeting the California Action Level of 3 micrograms/liter.

8. Page 5-1, 5.4 Aquifer Test. The Plan indicates that aquifer testing will be used to assess the effectiveness of the remedial alternatives. This evaluation should begin early on in the process for generating high quality data as the end product.

The contractor should begin plotting drawdown data generated in the first month while the first pumping well is online. This data should be used in analyzing the aquifer test and may also be helpful for indicating how much longer the test should continue.

9. Table A-1. The detection of perchlorate was not sufficiently explained in the background of the Plan. Perchlorate was detected in monitoring wells 02DGMW61 and 02NEW08A. However, the Plan did not include sampling for perchlorate at additional wells, hydropunch locations, or during the aquifer testing.

The contractor should include the analysis of perchlorate in the Plan.

If you have any questions, please contact Frank Gonzales at 714-484-5410.

Cc: Celsa Sanchez (2)



Department of Toxic Substances Control



Winston H. Hickox
Agency Secretary
California Environmental
Protection Agency

Edwin F. Lowry, Director
5796 Corporate Avenue
Cypress, California 90630

Gray Davis
Governor

November 26, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Marine Corps Air Station El Toro
Base Realignment and Closure
P.O. Box 51718
Irvine, California 92619-1718

FEDERAL FACILITY AGREEMENT (FFA) SCHEDULE FOR OPERABLE UNIT (OU)-
2C, INSTALLATION RESTORATION PROGRAM (IRP) SITES 3 AND 5, MARINE
CORPS AIR STATION (MCAS) EL TORO

Dear Mr. Gould:

The Department of Toxic Substances Control (DTSC) reviewed your letter dated November 14, 2001 requesting an extension to the deadline for OU-2C as forth in Appendix A of the FFA for MCAS El Toro. The extension request is made pursuant to Section 9.2(g) of the FFA.

As indicated in your letter, a three-month extension is needed to submit the draft final Record of Decision (ROD) for OU-2C. The Department of the Navy (DON) has requested that the submittal date for the draft final ROD change from November 14, 2001 to February 15, 2002. This extension request is necessary to accommodate additional time needed to conduct soil sampling as a followup to the radiological survey. This will delay the preparation of the draft Radiological Release Report and incorporation of those same results into the draft final ROD for OU-2C.

Mr. Dean Gould
November 26, 2001
Page 2

In addition to incorporating changes based on comments submitted for the draft ROD, the draft final ROD will include the following changes:

- Incorporation of results from the draft Radiological Release Report.
- Inclusion of Anomaly Area 3, APHO 46 and MSCR 2 in the proposed remedial action.
- Modification of language regarding institutional controls to reflect the memorandum of agreement for land use covenants between the DON and DTSC.

There will be substantial differences between the draft ROD (issued in March 1999) and the draft final ROD. As a result, in order for the next version of the ROD to be considered a draft final, the DON needs to coordinate with the Base Realignment and Closure Cleanup Team on the issues listed above prior to their incorporation into the draft final ROD.

DTSC agrees that good cause exists for the extension and hereby grants your request for changes to the FFA schedule. If you have any questions, please contact Ms. Triss Chesney, Remedial Project Manager, at (714) 484-5395.

Sincerely,



John E. Scandura, Chief
Southern California Branch
Office of Military Facilities

cc: Ms. Nicole Moutoux
Remedial Project Manager
U. S. Environmental Protection Agency Region IX
Superfund Division (SFD-8-1)
75 Hawthorne Street
San Francisco, California 94105-3901

Ms. Patricia Hannon
Remedial Project Manager
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3339



ston H. Hickox
Secretary for
Environmental
Protection

144/AES

California Regional Water Quality Control Board

Santa Ana Region



Gray Davis
Governor

Internet Address: <http://www.swrcb.ca.gov/rwqcb8>
3737 Main Street, Suite 500, Riverside, California 92501-3348
Phone (909) 782-4130 - FAX (909) 781-6288

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

October 4, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

**COMMENTS ON DRAFT TECHNICAL MEMORANDUM EVALUATION OF OU-1
ALTERNATIVE 8A WITH RESPECT TO NATIONAL OIL AND HAZARDOUS SUBSTANCES
POLLUTION CONTINGENCY PLAN (NCP) CRITERIA, FORMER MARINE CORPS AIR
STATION, EL TORO**

Dear Mr. Gould;

We have completed our review of the above-referenced document dated, April 2001, which we received on May 1, 2001. Based on the information in the report, we have the following comments:

Page 17, Section 5.3 Long-Term Effectiveness and Permanence

In reviewing this section and Table 3, "Simulated TCE Plume Area in the Principal Aquifer After 20 Years," there appears to be a discrepancy between Table 3 and the text. It is unclear which remedial alternatives are predicted to be the most effective, based on the amount of acreage with remaining TCE concentration over 5 µg/l in groundwater after 20 years.

If you should have any questions, please call me at (909) 782-4498 or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Redevelopment Authority
Mr. Mark Smits, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

California Environmental Protection Agency



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ston H. Hickox
Secretary for
Environmental
Protection

California Regional Water Quality Control Board

Santa Ana Region

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Gray Davis
Governor

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption.
For a list of simple ways you can reduce demand and cut your energy costs, see our website at www.swrcb.ca.gov/rwqcb8.*

October 11, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
MCAS EL Toro
P.O. Box 51718
Irvine, California 92619-1718

COMMENTS ON CLOSURE REPORT, LOCATION OF CONCERN, MSC JP-5, JP-5 PIPELINE UNITS MSCJP5-1 AND MSCJP5-3, FORMER MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above reference document, dated June 26, 2001, which we received on July 2, 2001. We have the following comments on this document:

We concur that the pipelines were abandoned in accordance with State pipeline closure requirements. However, this closure report does not address any potential releases associated with the former pipeline operations. The pipeline maintenance records should have been reviewed for repair or maintenance activities that could have had associated fuel releases from the system. If there are indications of past fuel releases, based on the review of historical records, those releases should be investigated and evaluated in the Closure Report.

For any questions on this review or related matters, please call me at (909) 782-4498.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms Nicole Moutoux, U.S. Environmental Protection Agency, Region IX
Ms. Triss Chesney, Department of Toxic Substances Control, OMF
Mr. Gregory F. Hurley, RAB Co-Chair, MCAS El Toro
Ms. Lynn Hornecker, Naval Facilities Engineering Command, SWDIV
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority

California Environmental Protection Agency



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aston H. Hickox
Secretary for
Environmental
Protection

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Governor

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October 11, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
MCAS EL Toro
P.O. Box 51718
Irvine, California 92619-1718

COMMENTS ON ADDENDUM TO SITE ASSESSMENT REPORT, FIREFIGHTER BURN PIT MSC B1, FORMER MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above reference document, dated February 15, 2001, which we received on February 23, 2001. We have no significant comments on this document and concur with the recommendation for no further action.

For any questions on this review or related matters, please call me at (909) 782-4498.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Nicole Moutoux, U.S. Environmental Protection Agency, Region IX
Ms. Triss Chesney, Department of Toxic Substances Control, OMF
Mr. Gregory F. Hurley, RAB Co-Chair, MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
Ms. Lynn Hornecker, Naval Facilities Engineering Command, SWDIV

California Environmental Protection Agency



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California Regional Water Quality Control Board

Santa Ana Region



ston H. Hickox
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October 11, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
MCAS EL Toro
P.O. Box 51718
Irvine, California 92619-1718

COMMENTS ON ADDENDUM TO SUMMARY REPORT, AERIAL PHOTOGRAPH ANOMALY (APHO) AREA 5, APHO 31, APHO 43, APHO 66, AND APHO 68, FORMER MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above reference document, dated May 9, 2001, which we received on May 21, 2001. We concur with the recommendation for no further action for APHO areas 5, 31, 43, 66, and 68.

For any questions on this review or related matters, please call me at (909) 782-4498.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms Nicole Moutoux, U.S. Environmental Protection Agency, Region IX
Ms. Triss Chesney, Department of Toxic Substances Control, OMF
Mr. Gregory F. Hurley, RAB Co-Chair, MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Local Redevelopment Authority
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October 17, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON DRAFT TECHNICAL MEMORANDUM, PHASE II EVALUATION OF RADIONUCLIDES IN GROUNDWATER AT FORMER LANDFILL SITES AND THE EXPLOSIVE ORDNANCE DISPOSAL (EOD) RANGE, FORMER U. S. MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould;

We have completed our review of the above-referenced document, dated July 2001, which we received on July 10, 2001. We do not have any comments on this document.

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Redevelopment Authority
Mr. Marc Smits, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

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California Regional Water Quality Control Board

Santa Ana Region



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October 17, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON DRAFT WORK PLAN, AQUIFER TEST, IRP SITE 2, MAGAZINE ROAD LANDFILL, FORMER U. S. MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould;

We have completed our review of the above-referenced document, dated August 2001, which we received on September 4, 2001. Based on the information in the report, we have the following comments:

Field Sampling Plan

1. Page 3-7 Section 3.1.3 Aquifer Test

Please explain the basis for selecting the proposed pumping rate.

2. Page 3-10 Section 3.2.4 Piezometer Construction

Please provide a more detailed description of the proposed piezometers, such as the diameter of each borehole, the depth of borings, and the estimated length of well screen for each piezometer. We also request that you provide a proposed well construction diagram. The actual "as-built" well diagram should be included in the final report for the piezometer installation.

3. Page 3-12

In this section, you state that the discharge from Site 2 will meet the substantive requirements of general permit Order No. 96-18 (General Groundwater Cleanup Permit for Discharges of Extracted and Treated Groundwater, Resulting from the Cleanup of Groundwater Polluted by Petroleum Hydrocarbons and/or Solvents). Discharge Authorization No. 96-18-181 was issued by the Executive Officer of the Regional Board for discharges of treated wastewater at IRP Site 16. This discharge authorization does not authorize any discharge at Site 2. Furthermore, General Order No. 96-18 does not include an effluent limitation for perchlorate, and as such an individual permit would be appropriate for discharges from Site 2 where perchlorate was detected. In conducting the aquifer test at Site 2, a one-time discharge of treated wastewater will occur. If characterization of the treated effluent from Site 2 shows the absence of pollutants, issuance of waste discharge requirements (WDRs) for the discharge could be conditionally waived.

In order for Board staff to prepare the appropriate documentation for a waiver of WDRs, and issue an authorization for the one-time discharge of treated water from Site 2, you must provide additional

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Mr. Gould

-2-

October 17, 2001

details on the proposed treatment and discharge of the extracted groundwater. The following information must be submitted:

- A site map showing where the extracted water will be stored, treated and discharged;
- A detailed description of the treatment system, including a schematic drawing of the proposed system;
- The estimated volume of treated water expected to be discharged; and,
- A list of the chemical parameters that the extracted groundwater will be analyzed for, both prior to and after treatment, including laboratory detection levels for chemical analysis.

Be advised that Order No. 96-18 expired on October 1, 2001 and was administratively extended until a new General Permit is adopted by the Board. Meanwhile, the discharge from IRP Site 16 is allowed to continue as previously approved. The new General Permit is scheduled for consideration at the December 7, 2001 meeting of the Regional Board.

4. Page 3-15 Section 3.5 Investigation-Derived Waste, Decontamination Water and Purged Groundwater

This section describes the possible use of a decontamination pit for collection of equipment decontamination water; however, it does not describe how the pit will be constructed, or whether it will be lined with an impermeable membrane. Please provide the details of the proposed pit construction and usage.

5. Page 4-11, Table: 4-2, Project Quality Control Criteria for Groundwater Samples

Please explain how the values listed under column heading Project Decision Threshold will be used.

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,



Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair, MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Redevelopment Authority
Mr. Don Whittaker, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX





ston H. Hickox
Secretary for
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California Regional Water Quality Control Board

Santa Ana Region



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October 17, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON DRAFT TECHNICAL MEMORANDUM - REPLACEMENT WELL INSTALLATION AND GROUNDWATER EVALUATION, FORMER U. S. MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above-referenced document, dated June 2001, which we received on June 12, 2001. Fifteen groundwater monitoring wells were installed to replace 15 wells with submerged screened intervals, located at six sites on base, and one site off base. Groundwater samples were collected from the new wells, and analyzed for volatile organic compounds (VOCs), using EPA Method 8260. The analytical results were compared to historical water quality data for the original wells. Notable differences were found in the VOC concentrations in the water samples collected from five of the 15 well pairs. Your recommendation is to resample the five well pairs.

Based on the information in the report, we concur with the recommendation for resampling of the five well pairs. In the data report for this additional sampling round, please include updated maps, clearly indicating the new well locations in relation to old wells.

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,

Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, MCAS El Toro Redevelopment Authority
Mr. Marc Smits, Naval Facility Engineering Command, SWDIV
Ms. Nicole Moutoux, U. S. EPA, Region IX

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Don H. Hickox
Secretary for
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California Regional Water Quality Control Board

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Gray Davis
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October 29, 2001

Mr. Dean Gould
BRAC Environmental Coordinator
Base Realignment & Closure, Environmental Div.
P O Box 51718
Irvine, CA 92619 -1718

COMMENTS ON DRAFT TECHNICAL MEMORANDUM, PRELIMINARY ASSESSMENT, BUILDING 307, FORMER U. S. MARINE CORPS AIR STATION, EL TORO

Dear Mr. Gould:

We have completed our review of the above-referenced document, dated October 2001, which we received at this office on October 23, 2001. Building 307 is located in the southwest corner of Site 24. The building was used for laundry and dry cleaning. Soil gas, soil, and groundwater samples were collected from the area beneath Building 307, and along the sanitary sewer which extends from Building 307 to the former sewage disposal plant. The samples were analyzed for volatile organic compounds (VOCs), using EPA method 8260B, to determine whether solvents were released as the result of activities in Building 307.

Low concentrations of VOCs were detected in nine of the 84 soil gas samples, and low concentrations of trichloroethene were detected in all three of the groundwater samples. There were no VOCs detected above the laboratory reporting limits in the soil samples. The low concentrations of contaminants that are present in the soil (as vapor) and in the groundwater in the vicinity of Building 307 do not appear to pose a significant threat to water quality, or to the beneficial uses of the groundwater at this site.

Based on the information in the report, and provided that the information is complete and accurate, we concur with the request for no further action at this site.

California Environmental Protection Agency



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Mr. Gould

-2-

October 29, 2007

If you should have any questions, please call me at (909) 782-4498, or send e-mail to phannon@rb8.swrcb.ca.gov.

Sincerely,



Patricia A. Hannon
SLIC/DoD/AGT Section

cc: Ms. Nicole Moutoux, U. S. EPA, Region IX
Ms. Triss Chesney, Dept. of Toxic Substances Control
Mr. Gregory F. Hurley, RAB Co-Chair MCAS El Toro
Ms. Polin Modanlou, Orange County Hall of Administration
Mr. Don Whittaker, Naval Facility Engineering Command, SWDIV



Subject: [CPEO-MEF] Budget Analysis

Date: Thu, 23 Aug 2001 17:40:24 -0700

From: Lenny Siegel <lsiegel@cpeo.org>

Organization: Center for Public Environmental Oversight

To: Military Environmental Forum <cpeo-military@igc.topica.com>

I've done a quick numerical comparison of some of the items in this year's (fiscal year 02) proposed Defense Environment budget, shown today in an earlier message, against numbers from the previous two years. Despite increases in the total Defense budget, the overall environmental security budget is proposed to fall by 11.6 percent compared to FY01. Compared to FY00 the drop is only about 5%.

The Navy Environmental Restoration budget dropped by nearly 14% compared to FY01 and over 11% compared to FY00. The Formerly Used Defense Sites proposal dropped by over 19% compared to FY01 and nearly 24% compared to FY00.

The Army BRAC budget dropped by nearly 45% compared to FY01 and nearly over 13% compared to FY00. The Navy BRAC budget dropped by nearly 65% compared to FY01 but only 3% compared to FY00. The Air Force, which had its BRAC budget cut mid-year last year, received a 68% increase compared to FY01, 60% compared to FY00.

All three armed services' already small environmental technology budgets have been cut significantly. The Army took a 68% hit this year and the Navy took a 32% cut. The Air Force programs identified as environmental technology dwindled from little to nothing.

Lenny

Lenny Siegel
Director, Center for Public Environmental Oversight
c/o PSC, 222B View St., Mountain View, CA 94041
Voice: 650/961-8918 or 650/969-1545
Fax: 650/961-8918
lsiegel@cpeo.org
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**Subject: [CPEO-MEF] New Defense Environmental Budget Figures**

**Date: Thu, 23 Aug 2001 13:17:28 -0700**

**From: Lenny Siegel <lsiegel@cpeo.org>**

**Organization: Center for Public Environmental Oversight**

**To: Military Environmental Forum <cpeo-military@jgc.topica.com>**

We've received the new Defense Environmental budget figures, including the President's fiscal year 02 budget proposal. If you have trouble reading the table posted below, please let me know, and I will send it to you in another form, directly.

Compared to fiscal year 01, there appear to be declines in all categories. Most notably, the Army and Navy BRAC (Base Realignment and Closure) cleanup budgets have been significantly reduced.

Lenny

#### DoD ENVIRONMENTAL PROGRAMS

Program Summary as of August 10, 2001

Figures in constant FY 2002 \$ million

FY 2000 FY 2001 FY 2002

#### Cleanup

|              |       |       |       |         |
|--------------|-------|-------|-------|---------|
| Army         | 388   | 395   | 390   |         |
| Navy         | 292   | 299   | 258   | \$41 m. |
| Air Force    | 387   | 381   | 385   |         |
| Former Sites |       | 246   | 235   | 190     |
| Agencies     | 26    | 21    | 24    |         |
| Subtotal*    | 1,340 | 1,332 | 1,247 |         |

#### BRAC

|           |     |     |     |          |
|-----------|-----|-----|-----|----------|
| Army      | 109 | 259 | 143 |          |
| Navy      | 127 | 396 | 139 | \$257 m. |
| Air Force | 130 | 120 | 202 |          |
| Agencies  | 1   | 7   | 7   |          |
| Subtotal* | 368 | 783 | 491 |          |

#### Compliance (Includes Personnel & Training)

|           |       |       |       |
|-----------|-------|-------|-------|
| Army      | 544   | 530   | 591   |
| Navy**    | 587   | 512   | 494   |
| Air Force | 426   | 404   | 377   |
| Agencies  | 154   | 209   | 160   |
| Subtotal* | 1,711 | 1,655 | 1,623 |

#### Conservation

|           |     |     |     |
|-----------|-----|-----|-----|
| Army      | 83  | 72  | 81  |
| Navy      | 29  | 20  | 21  |
| Air Force | 42  | 34  | 34  |
| Agencies  | 17  | 13  | 1   |
| Subtotal* | 170 | 140 | 138 |

#### Pollution Prevention

|           |     |     |     |
|-----------|-----|-----|-----|
| Army      | 87  | 47  | 46  |
| Navy      | 101 | 99  | 84  |
| Air Force | 101 | 96  | 97  |
| Agencies  | 2   | 16  | 17  |
| Subtotal* | 291 | 258 | 245 |

#### Environmental Technology

|           |     |     |    |
|-----------|-----|-----|----|
| Army      | 104 | 119 | 50 |
| Navy      | 105 | 99  | 67 |
| Air Force | 8   | 1   | -  |

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|           |     |     |     |
|-----------|-----|-----|-----|
| SERDP     | 59  | 60  | 69  |
| ESTCP     | 24  | 29  | 25  |
| Subtotal* | 301 | 308 | 211 |

## Total

|              |       |       |       |     |
|--------------|-------|-------|-------|-----|
| Army         | 1,315 | 1,422 | 1,302 |     |
| Navy         | 1,241 | 1,425 | 1,063 |     |
| Air Force    | 1,094 | 1,036 | 1,096 |     |
| Former Sites |       | 246   | 235   | 190 |
| Agencies     | 283   | 355   | 303   |     |
| Grand Total* | 4,181 | 4,474 | 3,954 |     |

\* May not add due to rounding

\*\* Navy Totals include Kaho'olawe

--

Lenny Siegel

Director, Center for Public Environmental Oversight

c/o PSC, 222B View St., Mountain View, CA 94041

Voice: 650/961-8918 or 650/969-1545

Fax: 650/961-8918

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October 19, 2001

Mayor
Kathryn McCullough

–Mayor Pro Tem
Helen Wilson

Council Members
Richard T. Dixon
Peter Herzog
Marcia Rudolph

City Manager
Robert C. Dunek

Mr. Gerard J. Thibeault
Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3348

Via Fax (909) 781-6288
and msmythe@rb8.swrcb.ca.gov

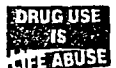
Subject: Comments on September 12, 2001, Draft Tentative Order No. 01-20
(NPDES No. CAS618030), Orange County Areawide Stormwater
NPDES Permit

Dear Mr. Thibeault:

The City of Lake Forest recognizes the significant effort that has gone into the preparation of the proposed permit and shares the Regional Board's goal of improving water quality within the Santa Ana Region. Your staff has prepared a significant revision to the permit. However, we believe that through the Tentative Order the staff seeks to establish new Regional Board policies that are inconsistent with the Clean Water Act (CWA), Porter-Cologne Act and State Water Resource Control Board Order 99-05. The City would like to work with the Regional Board and other interested parties to develop a practical permit that will lead to improved water quality in the receiving waters of Orange County.

City of Lake Forest staff attended the Workshop conducted by the Board on September 26, 2001. The opportunity to understand Regional Board perspectives and interpretations was valuable. The City has been an active participant in the Orange County Stormwater Program since shortly after its incorporation on December 20, 1991. The City also participates in all of the County-sponsored watershed committees for San Diego Creek, Newport Bay and Aliso Creek; as well as attends regular co-permittee meetings. In addition, the City has budgeted \$300,000 this fiscal year on water-quality-related capital and study programs, in addition to \$363,600 in watershed programs and NPDES participation. The City is firmly committed to the achievement of the goals of the Clean Water Act.

We are concerned that, as currently drafted, the proposed permit exceeds the Regional Board's authority and proposes a complex storm water quality regulatory framework that could invite third-party lawsuits and detract from the ability of the



City of Lake Forest to focus on storm water quality problems. As discussed below, our initial concerns relate to three broad areas. First, we are part of an integrated Orange County NPDES Storm Water Program encompassing all of Orange County, and we would prefer to see the integrated program continue. Second, your staff is proposing, even if inadvertently, to expand its control over local government, beyond the limits of the Clean Water Act and state law. Third, the draft permit imposes several requirements which would result in excessive financial burdens on municipalities. Board members should carefully review the impact of these requirements.

Conflicts with Orange County NPDES Storm Water Program

Because the majority of Orange County is under the Santa Ana Regional Board's jurisdiction and we are physically isolated from the San Diego metropolitan area by Camp Pendleton, the Santa Ana Board's permit has been used as the model for previous permits. Using the permit designed for Los Angeles County or San Diego County as a model for Orange County's new permit would adversely impact the integrated program that we have spent two permit cycles building and improving. Although the land area of the City of Lake Forest falls under the purview of two Regional Water Quality Control Boards, we have been able to create a unified program with the County of Orange as the Principal Permittee through cooperation and coordination with your Board and the San Diego Regional Board.

The Orange County program has a Drainage Area Management Plan (DAMP) that was adopted in 1993. The DAMP has guided the activities of our City and other Orange County cities within the jurisdictions of both Regional Boards. Furthermore the 2000 DAMP contains many new commitments to strengthen our integrated NPDES program. We respectfully request continuation and enhancement of the DAMP. However, the draft permit is overly prescriptive in its approach to storm water management by requiring the permittees to review and revise the existing DAMP to include certain specific elements and development of a Model Water Quality Management Plan (WQMP) and Watershed WQMPs.

Expansion of Control Over Local Government

The City of Lake Forest is concerned about the overly prescriptive nature of the proposed permit and is particularly concerned that your staff may be expanding control over local government in a manner not prescribed by the Clean Water Act.

The Findings in the Order, the discussion of Permit Requirement for Order No. 01-20 in the Fact Sheet, and the discussions of the broad and specific legal authority for the various draft permit provisions appear to be designed to justify expanded authority. The permit is so prescriptive and complex that it invites third-party lawsuits and virtually requires urban runoff enforcement regulators.

We are concerned that your Board may assert authority not specifically authorized by the Clean Water Act or Porter-Cologne. The City, through our Special Counsel, (the Firm of Burke, Williams & Sorensen, LLP), by letter dated October 18, 2001, have also provided a comment letter that further explains the City's concern that the Order is not consistent with federal or California law. In addition, the County of Orange has made several suggested changes to the draft findings prepared by staff.

Imposition of Unfunded Mandates and Economic Impact

By going beyond the requirements of the Clean Water Act and Porter-Cologne, the staff is proposing to impose a number of unanticipated unfunded mandates on local government. Inspection costs would be extremely burdensome. The requirement to "effectively prohibit the discharges of non-storm water into MS4s, unless such discharges are authorized by a separate NPDES permit or otherwise as specified..." is a major expense for the City. This requirement may well require the hiring of additional code enforcement personnel and could require the deployment of urban runoff enforcement regulators.

The Order would require consideration of conditions for new development that take away local land use prerogatives from local government and may require the construction of significant structural controls for treating discharges from new developments and redevelopment. Worse, they might require developers to create places that would serve as breeding grounds for vectors, including mosquitoes carrying the West Nile and other viruses. I am sure that you would agree, it is important in working to solve one environmental problem that we not create new ones.

The Order would significantly increase both the program and the management costs of each Co-permittee. The WQMP/SUSMP would require resources intended for implementation of the DAMP be spent on some lower priority drainage issues. In addition, as an unfunded mandate, the Order may in turn take monies away from already recognized high priority storm water issues as well as other high priority community needs. Responsibility for pollutants contained in discharges

into the municipal drainage system goes beyond the Clean Water Act. Many businesses will be subject to dual inspection enforcement by both state and municipal agencies. Additionally, the Order could result in enforcement action being taken against a municipality that is attempting in good faith to comply with permit requirements, as well as exposure to third-party lawsuits (including penalties of up to \$25,000 per day). We urge the Board to amend the Order to strengthen the DAMP rather than begin anew with WQMP/SUSMPs.

In addition, it appears that the Regional Board may be attempting to expand authority over local government in a manner not required or authorized by the Clean Water Act. Section 40 CFR 122.26(d)(2)(i) only requires that permittees demonstrate that they can operate pursuant to legal authority to take certain actions. The draft permit dictates that municipalities control the quality of storm water entering their storm drains, while the Clean Water Act addresses discharges *from* storm water systems to waters of the United States. These requirements clearly exceed both state and federal law and should be deleted from the permit.

Many of the proposed requirements in the draft permit would be administratively and operationally overwhelming to implement. We are concerned in particular that the permit:

- Requires a heavy workload by the City and several submittals within the first 365 days after adoption of the order (Monitoring and Reporting Program No. 01-20, Section V. Reporting Schedule). The City of Lake Forest is considering seeking federal funds to assist with the implementation of some of the components of the proposed permit. However, the timeline for application and potential receipt of federal grants is much longer than the Board's timeline for completion. As such, the Regional Board's implementation schedule may effectively lock out the City from the ability to obtain grant funds to offset the cost of these required programs;
- Attempts to expand Regional Board control over City policies and procedures by asserting in the Findings, with which the City does not concur, that:
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The proposed permit does not address the economic impacts that the Order would have on the City and the other permittees. Without an adequate analysis of the

costs of the proposed permit, the Regional Board cannot fulfill its obligation to take "economic considerations" into account when making its case-by-case determination of appropriate permit requirements meeting the maximum extent practicable standard and in issuing waste discharge requirements pursuant to state law. Therefore, the proposed permit fails to comply with Section 13241(d) of the Water Code and the Clean Water Act.

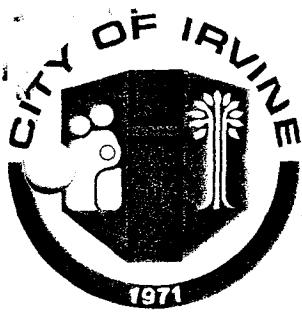
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November 7, 2001

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Dean Gould
Southwest Division, BRAC Operations Office
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Dear Ms. Moutoux, Ms. Chesney, Ms. Hannon, and Mr. Gould,

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First, the report does not give an adequate background regarding dry cleaning activities and, as such, may mischaracterize some aspects of the findings. Second, there is inadequate discussion of likely contamination patterns that might be found were there to be a leak in the piping below Building 307 and the sewer line between Building 307 and the former sewage treatment plant. Third, the conclusions should be modified to reflect the consideration of CFC-113 as a primary constituent of concern raising the possibility that further investigation of the sewer line between Building 307 and the former sewage treatment plant may be appropriate. Moreover, any

conclusion about whether or not leaks occurred from this sewer line or from any other sewer lines elsewhere on the base are groundless.

Dry Cleaning Activities

The draft technical memorandum notes that laundry and dry cleaning activities occurred during the period from approximately 1944 to 1977, which was the time of potential perchloroethylene (PCE) and carbon tetrachloride use. The draft technical memorandum fails to note that CFC-113 (also known by DuPont's trade name as Freon-113) was also in common use during this period for dry cleaning activities.

During the immediate pre-war period, carbon tetrachloride began to replace Stoddard's solvent (a hydrocarbon) due to the flammability of the latter. Carbon tetrachloride itself was phased out beginning in the late 1950s and early 1960s due to its toxicity. PCE, perceived to be less toxic, grew in use to become the primary dry cleaning solvent. However, during this period CFC-113 was used for dry cleaning as an alternative to PCE for some synthetic fibers, garments with plastic trim items, and leather and suede clothing, because the PCE was considered too harsh for these materials.

Thus, in addition to the possible contamination due to PCE and carbon tetrachloride, there is also the possibility of CFC-113 contamination and CFC-113 should be considered a primary chemical of potential concern in the study.

Potential Contamination Patterns

Sampling of soil gas and soil for PCE (and TCE, the major contaminant of groundwater and soil at MCAS El Toro) is appropriate by virtue of the high likelihood that any leak to the soil via the sewer lines will result in substantial adsorption and a very slow degradation rate and/or release. However, such an approach makes less sense for either CFC-113 or carbon tetrachloride. Both are highly volatile, unlikely to adsorb onto soil particles, and more likely to move to groundwater if released to soil. Thus, soil gas and soil sampling for materials released in the 1940s and 1950s in the case of carbon tetrachloride, and the 1950s through the 1970s in the case of CFC-113, is not likely to show much evidence of a release. This is supported by the data presented in the draft technical memorandum.

CFC-113 was identified in two locations: in soil gas at 15' bgs under Building 307 (sample location 7) and along the sewer line at 15' and 66' bgs (location 23). These sample results may indicate several leaks in the piping and sewer. At location 7, the CFC-113 may have leaked and remain trapped in soil gas with the building floor serving as a barrier to volatilization to air. At location 23, the samples are consistent with a leak where the mass has partially volatilized to air, with the remaining quantity moving towards groundwater.

We also note the small number of groundwater samples taken downgradient from Building 307 and the sewer line. In particular, we note that HP03 is cross gradient from the location 23 where

CFC-113 was identified in shallow and deep samples; HP02 also appears inappropriately located to detect CFC-113 associated with location 7.

Appropriateness of the Conclusions

The technical memorandum concludes that the sampling results show that there has not been a significant release of VOCs to the environment due to operations conducted within Building 307 or along the sewer line associated with the building. The conclusions note that the (PCE, TCE, DCE, and carbon tetrachloride) were all less than 1 µg/l for shallow depths and less than 10 µg/l for deeper samples. However, we believe that CFC-113 should be considered a primary constituent of concern for this analysis. Because the results for this substance are above 1 µg/l at shallow depths and above 10 µg/l for deeper samples, the conclusion may not be valid. Indeed the results may be consistent with a leak of CFC-113.

The small number of samples downgradient from Building 307 and the sewer line may be inadequate to draw any conclusions about possible groundwater contamination that may have resulted from a leak.

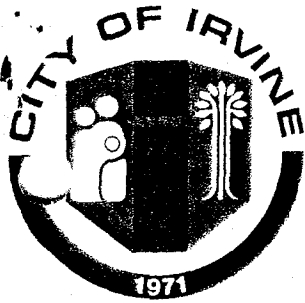
We urge you to consider whether or not the quantities of CFC-113 identified in the soil reach the level of significance appropriate for further action at this location. We also urge caution on drawing any conclusion about the integrity of the piping and sewer system associated with Building 307 and any other location at MCAS El Toro based on these results.

Sincerely,



DANIEL JUNG
Director of Strategic Programs

Cc: Allison Hart, City Manager
Michael S. Brown, Michael S. Brown and Associates
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RE: Additional comments on Draft Technical Memorandum, Building 307

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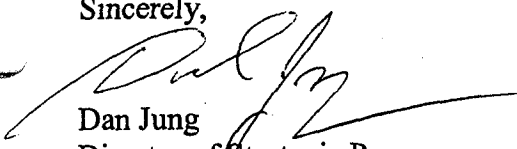
Briefly, in our previous comments, we argued that CFC-113 (also known by DuPont's trade name as Freon-113) should be considered a primary constituent of concern due to its use as a dry cleaning solvent while the laundry facility was in operation. We noted that at location 23, the

samples are consistent with a CFC-113 leak where the mass has partially volatilized to air, with the remaining quantity moving towards groundwater. And we urged that the results of the sampling not be considered conclusive evidence for the integrity of the piping and sewer system associated with Building 307 or any other location at MCAS El Toro based on these results.

We urge you to consider the results of the Round 13 of the Groundwater Monitoring program. Results presented in the "Final Groundwater Monitoring Report, February 2001 Monitoring Round 13" (October 22, 2001) support our previous comments. In particular, please review the sampling results for monitoring well 12DBMW-48A located on Site 12, the former wastewater treatment facility. At that location, sampling identified a concentration of 210 µg/l in groundwater. Other wells where CFC-113 was detected cross gradient (to the east) to that site indicating that potentially the contamination at Site 12 is from a different source. This finding is consistent with a CFC-113 leak from the piping and sewer system and provides an explanation for the sampling results obtained during the investigation of Building 307.

We urge you to include the results of Groundwater Monitoring Round 13, as well as any subsequent groundwater monitoring results, in the analysis for the Draft Technical Memorandum and again urge you to consider that these findings are indicative of the piping and sewer system as a source for VOCs.

Sincerely,



Dan Jung

Director of Strategic Programs

Cc: Allison Hart, City Manager
Michael S. Brown, Michael S. Brown and Associates
Marcia Rudolph, MCAS El Toro RAB
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October 19, 2001

Mayor
Kathryn McCullough

Mayor Pro Tem
Helen Wilson

Council Members
Richard T. Dixon
Peter Herzog
Marcia Rudolph

City Manager
Robert C. Dunek

Mr. Gerard J. Thibeault
Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, California 92501-3348

Via Fax (909) 781-6288
and msmythe@rb8.swrcb.ca.gov

Subject: Comments on September 12, 2001, Draft Tentative Order No. 01-20
(NPDES No. CAS618030), Orange County Areawide Stormwater
NPDES Permit

Dear Mr. Thibeault:

The City of Lake Forest recognizes the significant effort that has gone into the preparation of the proposed permit and shares the Regional Board's goal of improving water quality within the Santa Ana Region. Your staff has prepared a significant revision to the permit. However, we believe that through the Tentative Order the staff seeks to establish new Regional Board policies that are inconsistent with the Clean Water Act (CWA), Porter-Cologne Act and State Water Resource Control Board Order 99-05. The City would like to work with the Regional Board and other interested parties to develop a practical permit that will lead to improved water quality in the receiving waters of Orange County.

City of Lake Forest staff attended the Workshop conducted by the Board on September 26, 2001. The opportunity to understand Regional Board perspectives and interpretations was valuable. The City has been an active participant in the Orange County Stormwater Program since shortly after its incorporation on December 20, 1991. The City also participates in all of the County-sponsored watershed committees for San Diego Creek, Newport Bay and Aliso Creek; as well as attends regular co-permittee meetings. In addition, the City has budgeted \$300,000 this fiscal year on water-quality-related capital and study programs, in addition to \$363,600 in watershed programs and NPDES participation. The City is firmly committed to the achievement of the goals of the Clean Water Act.

We are concerned that, as currently drafted, the proposed permit exceeds the Regional Board's authority and proposes a complex storm water quality regulatory framework that could invite third-party lawsuits and detract from the ability of the



City of Lake Forest to focus on storm water quality problems. As discussed below, our initial concerns relate to three broad areas. First, we are part of an integrated Orange County NPDES Storm Water Program encompassing all of Orange County, and we would prefer to see the integrated program continue. Second, your staff is proposing, even if inadvertently, to expand its control over local government, beyond the limits of the Clean Water Act and state law. Third, the draft permit imposes several requirements which would result in excessive financial burdens on municipalities. Board members should carefully review the impact of these requirements.

Conflicts with Orange County NPDES Storm Water Program

Because the majority of Orange County is under the Santa Ana Regional Board's jurisdiction and we are physically isolated from the San Diego metropolitan area by Camp Pendleton, the Santa Ana Board's permit has been used as the model for previous permits. Using the permit designed for Los Angeles County or San Diego County as a model for Orange County's new permit would adversely impact the integrated program that we have spent two permit cycles building and improving. Although the land area of the City of Lake Forest falls under the purview of two Regional Water Quality Control Boards, we have been able to create a unified program with the County of Orange as the Principal Permittee through cooperation and coordination with your Board and the San Diego Regional Board.

The Orange County program has a Drainage Area Management Plan (DAMP) that was adopted in 1993. The DAMP has guided the activities of our City and other Orange County cities within the jurisdictions of both Regional Boards. Furthermore the 2000 DAMP contains many new commitments to strengthen our integrated NPDES program. We respectfully request continuation and enhancement of the DAMP. However, the draft permit is overly prescriptive in its approach to storm water management by requiring the permittees to review and revise the existing DAMP to include certain specific elements and development of a Model Water Quality Management Plan (WQMP) and Watershed WQMPs.

Expansion of Control Over Local Government

The City of Lake Forest is concerned about the overly prescriptive nature of the proposed permit and is particularly concerned that your staff may be expanding control over local government in a manner not prescribed by the Clean Water Act.

The Findings in the Order, the discussion of Permit Requirement for Order No. 01-20 in the Fact Sheet, and the discussions of the broad and specific legal authority for the various draft permit provisions appear to be designed to justify expanded authority. The permit is so prescriptive and complex that it invites third-party lawsuits and virtually requires urban runoff enforcement regulators.

We are concerned that your Board may assert authority not specifically authorized by the Clean Water Act or Porter-Cologne. The City, through our Special Counsel, (the Firm of Burke, Williams & Sorensen, LLP), by letter dated October 18, 2001, have also provided a comment letter that further explains the City's concern that the Order is not consistent with federal or California law. In addition, the County of Orange has made several suggested changes to the draft findings prepared by staff.

Imposition of Unfunded Mandates and Economic Impact

By going beyond the requirements of the Clean Water Act and Porter-Cologne, the staff is proposing to impose a number of unanticipated unfunded mandates on local government. Inspection costs would be extremely burdensome. The requirement to "effectively prohibit the discharges of non-storm water into MS4s, unless such discharges are authorized by a separate NPDES permit or otherwise as specified..." is a major expense for the City. This requirement may well require the hiring of additional code enforcement personnel and could require the deployment of urban runoff enforcement regulators.

The Order would require consideration of conditions for new development that take away local land use prerogatives from local government and may require the construction of significant structural controls for treating discharges from new developments and redevelopment. Worse, they might require developers to create places that would serve as breeding grounds for vectors, including mosquitoes carrying the West Nile and other viruses. I am sure that you would agree, it is important in working to solve one environmental problem that we not create new ones.

The Order would significantly increase both the program and the management costs of each Co-permittee. The WQMP/SUSMP would require resources intended for implementation of the DAMP be spent on some lower priority drainage issues. In addition, as an unfunded mandate, the Order may in turn take monies away from already recognized high priority storm water issues as well as other high priority community needs. Responsibility for pollutants contained in discharges

into the municipal drainage system goes beyond the Clean Water Act. Many businesses will be subject to dual inspection enforcement by both state and municipal agencies. Additionally, the Order could result in enforcement action being taken against a municipality that is attempting in good faith to comply with permit requirements, as well as exposure to third-party lawsuits (including penalties of up to \$25,000 per day). We urge the Board to amend the Order to strengthen the DAMP rather than begin anew with WQMP/SUSMPs.

In addition, it appears that the Regional Board may be attempting to expand authority over local government in a manner not required or authorized by the Clean Water Act. Section 40 CFR 122.26(d)(2)(i) only requires that permittees demonstrate that they can operate pursuant to legal authority to take certain actions. The draft permit dictates that municipalities control the quality of storm water entering their storm drains, while the Clean Water Act addresses discharges *from* storm water systems to waters of the United States. These requirements clearly exceed both state and federal law and should be deleted from the permit.

Many of the proposed requirements in the draft permit would be administratively and operationally overwhelming to implement. We are concerned in particular that the permit:

- Requires a heavy workload by the City and several submittals within the first 365 days after adoption of the order (Monitoring and Reporting Program No. 01-20, Section V. Reporting Schedule). The City of Lake Forest is considering seeking federal funds to assist with the implementation of some of the components of the proposed permit. However, the timeline for application and potential receipt of federal grants is much longer than the Board's timeline for completion. As such, the Regional Board's implementation schedule may effectively lock out the City from the ability to obtain grant funds to offset the cost of these required programs;
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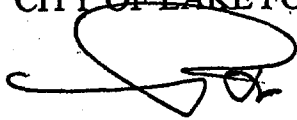
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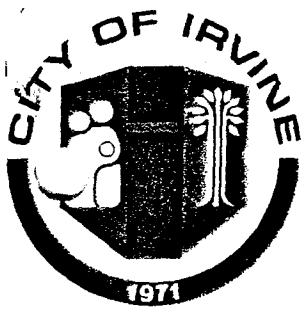
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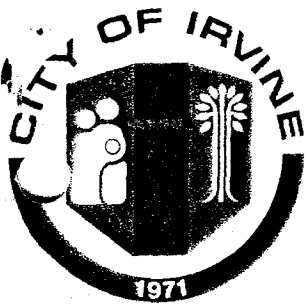
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Dear Ms. Moutoux, Ms. Chesney, Ms. Hannon, and Mr. Gould:

I am writing to you with additional comments on the recently released "Draft Technical Memorandum, Preliminary Assessment, Building 307, Marine Corps Air Station (MCAS), El Toro, California" (22 October 2001). We recognize that these additional comments come after the deadline for response, but we hope you will consider them.

Briefly, in our previous comments, we argued that CFC-113 (also known by DuPont's trade name as Freon-113) should be considered a primary constituent of concern due to its use as a dry cleaning solvent while the laundry facility was in operation. We noted that at location 23, the

samples are consistent with a CFC-113 leak where the mass has partially volatilized to air, with the remaining quantity moving towards groundwater. And we urged that the results of the sampling not be considered conclusive evidence for the integrity of the piping and sewer system associated with Building 307 or any other location at MCAS El Toro based on these results.

We urge you to consider the results of the Round 13 of the Groundwater Monitoring program. Results presented in the "Final Groundwater Monitoring Report, February 2001 Monitoring Round 13" (October 22, 2001) support our previous comments. In particular, please review the sampling results for monitoring well *12DBMW-48A* located on Site 12, the former wastewater treatment facility. At that location, sampling identified a concentration of 210 µg/l in groundwater. Other wells where CFC-113 was detected cross gradient (to the east) to that site indicating that potentially the contamination at Site 12 is from a different source. This finding is consistent with a CFC-113 leak from the piping and sewer system and provides an explanation for the sampling results obtained during the investigation of Building 307.

We urge you to include the results of Groundwater Monitoring Round 13, as well as any subsequent groundwater monitoring results, in the analysis for the Draft Technical Memorandum and again urge you to consider that these findings are indicative of the piping and sewer system as a source for VOCs.

Sincerely,



Dan Jung

Director of Strategic Programs

Cc: Allison Hart, City Manager
Michael S. Brown, Michael S. Brown and Associates
Marcia Rudolph, MCAS El Toro RAB
Greg Hurley, MCAS El Toro RAB

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November 20, 2001**RESOLUTION OF THE BOARD OF SUPERVISORS
ORANGE COUNTY, CALIFORNIA
2001**

WHEREAS, completion of Alton Parkway between Irvine Blvd. and the Foothill Transportation Corridor has been included in the County Master Plan of Arterial Highways since 1981; and,

WHEREAS, the County of Orange adopted the Foothill Circulation Phasing Plan in 1987 in order to construct and implement a regional road network necessary to support existing and new development within the foothill area of Orange County; and,

WHEREAS, completion of Alton Parkway represents the final roadway link identified in the Foothill Circulation Phasing Plan; and,

WHEREAS, the effectiveness of the surrounding regional road network is decreased due to an incomplete Alton Parkway; and,

WHEREAS, conveyance of Alton Parkway right-of-way or a perpetual easement thereto, from the Department of the Navy to the County of Orange for the segment within the boundaries of the former Marine Corps Air Station (MCAS) at El Toro is necessary for completion of this critically important roadway; and,

WHEREAS, the design and construction of Alton Parkway and related improvements to Borrego Creek are anticipated to require regulatory permits or authorization from the U. S. Army Corps of Engineers, California Department of Fish and Game, Regional Water Quality Control Board and potentially U.S. Fish and Wildlife Service.

NOW, THEREFORE, the Orange County Board of Supervisors does hereby resolve as follows:

SECTION 1. The Board of Supervisors strongly support the timely construction of Alton Parkway.

SECTION 2. The Board of Supervisors urge the Department of the Navy to take all necessary steps expeditiously, including review under the National Environmental Protection Act, to convey the right-of-way for Alton Parkway, or grant a perpetual easement thereto, to the County of Orange to allow for the construction and operation of Alton Parkway as soon as possible.

SECTION 3. The Board of Supervisors urge the Army Corps of Engineers, California Department of Fish and Game, Regional Water Quality Control Board and U.S. Fish and Wildlife Service to expedite consideration of Alton Parkway and Borrego Creek improvements, including the design and mitigation plan, to insure an efficient and timely application and document review process.

SECTION 4. The Board of Supervisors urge the Army Corps of Engineers, California Department of Fish and Game, Regional Water Quality Control Board and U.S. Fish and Wildlife Service to work cooperatively with the County of Orange and other related parties to facilitate the construction of Alton Parkway in a timely manner.

PASSED, APPROVED AND ADOPTED this _____ day of _____ 2001 by the following vote: